BULLETIN of the
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INDIANA UNIVERSITY

Indiana and Midwest School Building Planning Conference: Proceedings

Vol. XXV, No. 5 September, 1949

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FOREWORD

THE program of the 1949 Indiana and Midwest School Building Conference has been built around the theme "Practical Solutions to Pressing School Building Problems." The problems and solutions to be discussed are to be considered in their broadest aspects, giving much attention to fundamental principles both in the methods and the content of planning. It was planned that considerable stress be given in the conference to cooperative planning (using pupils, parents, teachers, and other employees as participants) not only in order to define more fully the educational aims of a community but also because such cooperative planning is an important phase of American living and "grass roots" democracy. An important observation made by the several German and Austrian architects whom I have sponsored in this country is the tremendous amount of free time Americans give to community, state, and nation-wide activities without any monetary return. This, of course, is fundamental to our way of life and, unless fostered properly, will result in governmental bureaucracy or totalitarianism.

Thus the stage will be set at the beginning of the conference by the people who use the buildings, namely, the pupils and teachers and those most vitally interested in the educational product, the parents. Their panel and round table discussions will be designed not only to call attention to the inadequacies of present buildings but to focus attention on the trends of educational thinking in terms of community needs.

These discussions will then be followed by more specific ideas on making schools livable for the people who are to occupy them, and on the methods of determining areas for learning. It is thought desirable, then, to review our educational philosophy and measure our practices in terms of our philosophy. This will naturally result in the admonishment to look well to our planning from the point of view of present needs as well as of the possible impact upon future generations.

With the above-mentioned considerations of philosophy, cooperative planning, and community needs in mind, the experts, architectural and educational, will be in a position to predict future trends in school building planning, in design, equipment, materials, use, and costs. This will give a logical development to the conference, beginning with the philosophy at the grass roots and leading up to building trends.

Because of the growing interest in air sterilization, or ultraviolet irradiation of air, it has been thought desirable to obtain more explicit information concerning the installation, maintenance, use, and effectiveness of germicidal lights as determined by the latest laboratory and field experiments. Thus one of the nation's foremost scientists in this field has consented to enlighten us in terms understandable to the man on the street.

Even though the reader will not be able to catch, to any great degree, the enthusiastic quest-for-knowledge spirit which we believe will pervade

the conference, it is hoped that he will find within the covers of this bulletin many of the facts he wants and, even more important, that he will receive the inspiration to dedicate himself more fully to a much more sensible, realistic approach to planning livable, educational environment for boys and girls which, at the same time, can serve for community functions.

PAUL W. SEAGERS,
Conference Chairman.

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PROGRAM

Indiana and Midwest School Building Planning Conference

THEME:

"Practical Solutions to Pressing School Building Problems"

This Conference Is Designed to Bring Out the Problems Confronting Superintendents of Schools, Boards of Education, and Communities in Connection with Increased School Enrollments and Rapid Deterioration of School Buildings.

Paul W. Seagers, Conference Chairman
Wendell W. Wright, Dean, School of Education

MEN'S LOUNGE
MEMORIAL UNION BUILDING INDIANA UNIVERSITY
BLOOMINGTON, INDIANA

FRIDAY AND SATURDAY
JULY 15 AND 16, 1949

INDIANA UNIVERSITY—SCHOOL OF EDUCATION
Division of Research and Field Services

GUEST SPEAKERS

N. L. Engelhardt, Sr., of Engelhardt, Engelhardt, & Leggett, Educational Consultants, New York City, formerly Professor of Education at Teachers' College, Columbia University, and Associate Superintendent of Schools in New York City

John H. Herrick, Head of the Survey Division, Bureau of Educational Research, College of Education, Ohio State University, Columbus, Ohio

L. J. Buttolph, Director of Ultraviolet Irradiation, Engineering Division, General Electric Company, Nela Park, Cleveland, Ohio

FRIDAY MORNING, JULY 15
Alumni Hall, Union Building

9:00 a.m.*
Registration ..... Lobby, Union Building

10:00 a.m.
Presiding ..... Otto Hughes
Principal, University High School

10:05 a.m.
Address of Welcome ..... Wendell W. Wright
Dean, School of Education, Indiana University

10:20 a.m.
Round-Table Discussion: *"Schools for Youthful Living"*
Lucy G. Emry—University High School
James Jordan—Muncie Central High School
Ronald C. Williams—Columbus High School
Terry Smith—Elkhart High School
Roger Neal—Bloomington High School

11:00 a.m.
Remarks ..... Karl Lorenz
Professor of Architecture at Graz
Technische Hochschule, Vienna, Austria

11:20 a.m.
Discussion

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* Daylight Saving Time

FRIDAY AFTERNOON, JULY 15
Alumni Hall, Union Building

1:30 p.m.
Presiding ..... Ralph Becker
Superintendent of Schools, Evansville, Indiana
Panel Discussion: *"Schools for Efficient Teaching"*
Panel Members:
Margaret Mercille, Critic Teacher, University High School, Bloomington
Beulah E. Book, Art Supervisor, New Castle, Indiana
Alice C. Dempster, Supervisor, Meridian, Mississippi
Richard E. Emery, Director of Distributive Education, Indianapolis, Indiana
Karl W. Bookwalter, Director of Bureau of Service and Research, School of Health, Physical Education, and Recreation, Indiana University

2:00 p.m.
"The Need for Planning School Buildings".....Deane Walker
Indiana State Superintendent
of Public Instruction

2:20 p.m.
Round-Table Discussion: *"Educational Environment for Our Children"*
Mrs. Joseph W. Walker, President, Indiana Congress of Parents and Teachers, Greenfield, Indiana
Mrs. O. C. Redenbacher, Princeton, Indiana
Mrs. Philip Reed, Indianapolis, Indiana
Mrs. Leonard Miller, Boonville, Indiana
O. H. Roberts, Jr., Attorney, Evansville, Indiana
Mrs. William Strain, Bloomington, Indiana

3:10 p.m.
"Let's Make Schools Livable" .....Paul W. Seagers
Assistant Professor of Education, Indiana University

3:35 p.m.
Discussion

FRIDAY EVENING, JULY 15
Alumni Hall, Union Building

7:30 p.m.
Presiding .....Floyd A. Hines
Superintendent of Schools, Connersville, Indiana

7:35 p.m.
Greetings from the State Department.....Henry Lester Smith
Dean Emeritus, School of Education, Indiana University, and Director of School Buildings, Indiana State Department of Public Instruction

8:00 p.m.
"Designing Areas for Learning" .....John H. Herrick

9:00 p.m.
"Look Well to Your Planning".....N. L. Engelhardt, Sr.

SATURDAY MORNING, JULY 16
Alumni Hall Union Building

9:00 a.m.
Presiding .....J. Everett Light
Superintendent of Schools, Rushville, Indiana

9:05 a.m.
Round-Table Discussion: *"The Experts Predict Trends"*
Raymond S. Kastendieck, President, Indiana Chapter A. I. A., Gary, Indiana

Ralph Legeman, Architect, Evansville, Indiana
Karl R. Schwarz, Architect, South Bend, Indiana
Walter Scholer, Architect, Lafayette, Indiana
N. L. Engelhardt, Sr., New York City
John H. Herrick, Ohio State University, Columbus, Ohio

10:05 a.m.
"*Germicidal Lighting for Schools*" .....L. J. Buttolph

11:15 a.m.
Discussion

11:45 a.m.
Summary .....Paul W. Seagers

ADDRESS OF WELCOME

by

WENDELL W. WRIGHT
Dean, School of Education
Indiana University

THE older I get, the more I come to appreciate the guy with the cockeyed idea. It would seem that increasing years and a natural conservatism ought to work in the other direction, but honest thinking amplifies my appreciation for deviation.

If you look back, let us say approximately a hundred years, and review the material and social progress of our people, you cannot help but doff your hat to the man who believed in the cockeyed idea. There was a man who believed that electrical energy could be harnessed and even produced. What a fool he must have been in his day. Out of that cockeyed idea and those that followed, we have the artificial light about which you will talk at this conference. Somebody had a cockeyed idea that heavier than air machines could navigate in the air. I called for a man yesterday morning by long distance telephone. He was not to be in his office until Saturday morning but I heard the secretary tell the telephone operator that he was in London and could be reached by calling so-and-so. All wrapped up in this incident were the results of a hundred cockeyed ideas which have now become commonplace.

There was a man—I suppose he must have been crazy—who once upon a time thought we ought to educate all the children of all the people. This cockeyed guy said that no matter where a child lived, no matter what his family, color, race, or creed, he deserved an education, and that all people should be taxed to make this possible.

There were foolish men and women who thought the death rates of children could be reduced and that smallpox could be stamped out.

There are even people now who tell us that children should be children and that they should be treated as developing children, not as little adults. Some cockeyed architects have had ideas that we might even build schoolhouses from that point of view.

Somehow or other, as I look just hastily over the pages of history, I form a reverence for the man who has different ideas. At the time, he is an awful pest. He upsets our well organized and well orientated thinking. But if history teaches us anything, it ought to teach us to appreciate him.

I have often said that if I could have only one measure—just one—by which to judge a school system, I would pick the measure of variability within that system. How many of the teachers are trying out *something new*. If I found that there was much variability, that many new ideas were being tried and experiments going on, and that teachers were feeling the security which ought to be theirs in that variation, then I would know that their school was growing. If I found no variability, I would know that their school growth was certainly stunted, if not dying. If my

conservative good sense tells me anything worth-while, it is that I should worship the variant.

In schoolhouse planning and building today, we need the variant—the man with the cockeyed idea. In years to come we will call him the man of vision.

As I welcome you to Indiana University today at this conference, may I also say "welcome" in a true sense to the new ideas—yes, even the cockeyed ideas—that may come out of this conference. They may well be the buildings of tomorrow.

SCHOOLS FOR YOUTHFUL LIVING

ROUND-TABLE DISCUSSION

Presiding: OTTO HUGHES, Principal, University High School
Discussion Group:
LUCY G. EMRY, University High School
JAMES JORDAN, Muncie Central High School
RONALD C. WILLIAMS, Columbus High School
TERRY SMITH, Elkhart High School
ROGER NEAL, Bloomington High School

MR. HUGHES: What is your version of schools for youthful living?

TERRY SMITH: Corridors should be "nice halls" that are well lighted and, above all, without lockers along the sides; the lockers should be in a special room. Along the halls should be the classrooms which have movable tables with chairs, and on which are placed individual study lamps furnishing the artificial lighting. Bilateral lighting should furnish the necessary lighting by reflecting light and eliminating glare through the use of glass blocks. The conventional ceiling lights for schools would be eliminated. All woodwork should be light-colored and the room should be equipped with green "blackboards" (chalkboards).

The cafeteria and gymnasium should be considered next; the former being large enough to serve the students and faculty without crowding; the latter large enough to house a big gymnasium and a swimming pool. A large student play area outside should be attractively landscaped.

RONALD WILLIAMS: What about wire connections for the individual lamps on the movable tables?

TERRY SMITH: Place outlets in the floors or wire on the table legs. It may cost, but it will be money well spent.

MR. HUGHES: Just what is your version of schools for youthful living, Roger?

ROGER NEAL: Schools should give more room to the athletic program by having more adequate facilities—football fields, swimming pools, basketball floor space, and plenty of room for spectators—and more facilities for intramural sports. The athletic field should be built so that seasonal sports may be played on the same field. Schools should also have more facilities for students who do not participate in high school sports.

TERRY SMITH: You mean large enough to do away with conflicts?

ROGER NEAL: Yes.

LUCY EMRY: Yes, and for hockey and football!

TERRY SMITH: Isn't there too much money spent for just a few in athletics? I think some of this money might be better spent on windows and other things.

ROGER NEAL: The admission charge for athletics will pay for the cost.

TERRY SMITH: The athletic program should not be considered the only source of revenue for a school. There are better means of social activity than just in the stadium. Put it in civic recreation. Schools

might profit by having a small theater, the revenue of which could be turned back to the school.

LUCY EMRY: You could enlarge the home economics department. Don't put the home economics department in the school building, but place it in a home adjacent to the school, where students may make practical use of the knowledge they gain in the classes. Classes should be mixed, and teachers should be well-trained.

The building need not be beautiful. Perhaps it might be some type of house where students could experiment with redecorating, painting, and repairing. It should have a basement where furniture could be repaired; a laundry room equipped with not only a Bendix washer, but with an old type washer, so that experience may be gained with both types; and a set of laundry tubs. The kitchen should be equipped with small experimental units from various companies, so that students may have opportunities for comparing the merits of the equipment from each company. In the living room the marriage relation classes of boys and girls would meet, where side by side they would learn those things important in marriage.

ROGER NEAL: Wouldn't some of this be overdone?

LUCY EMRY: Other things can be done.

JAMES JORDAN: The idea is O. K., but I disagree.

TERRY SMITH: The idea should be carried further. Build a school made up of several small independent units and do not have all departments housed in one building. Each house would have three or four classrooms in which would be taught closely related subjects. Covered ways could be erected between the buildings. Four buildings placed in a rectangular shape and covered in this way would help to add beauty to the school plant.

ROGER NEAL: What would you do about announcements?

LUCY EMRY: Have an intercommunication system in the school. The system could be used with the radio to an advantage.

RONALD WILLIAMS: Have a modern intercommunication system with provisions made to facilitate the use of television.

ROGER NEAL: In addition, public relations in the school could be partially handled by the radio. The Bloomington High School has a regular broadcasting studio, and three weekly broadcasts originating from the school studio are aired over a local station and piped over the intercommunication system as well.

RONALD WILLIAMS: If you are going to have good public relations, why not build more rooms for community use?

TERRY SMITH: Keep the outside organizations outside; school is for school activities only!

JAMES JORDAN: No one has a better right to use the building than the taxpayer. If taxpayers build auditoriums and schools, why can't they use them?

TERRY SMITH: Let them use the buildings whenever we are not using them.

LUCY EMRY: Let the city make its own civic center so that overlapping isn't necessary.

MR. HUGHES: Our time is almost up. Are there any last minute general thoughts you wish to throw in before we close the discussion?

ROGER NEAL: We need more cupboard space and larger classrooms.

LUCY EMRY: Let's have no more cream colored walls; give us more colors. Have dressing rooms for the stage.

JAMES JORDAN: Have sound engineers adapt the stage and auditorium for good hearing, and have classrooms based on the environment created by the subject matter.

ROGER NEAL: Give more shower space.

TERRY SMITH: Expand the outside area and have freight elevators.

LUCY EMRY: Have a recreational room for dancing, with coke bars, ping-pong tables, candy, and an hour for the lunch period.

RONALD WILLIAMS: Have television for the study of plays.

LUCY EMRY: I know the time is almost gone, but I want to add that the lockers are entirely too small for modern clothing. We should have a health office, and girls should have hair driers in the gymnasium.

REMARKS

by

KARL LORENZ
Professor of Architecture at Graz
Technische Hochschule, Vienna, Austria

LET me first thank you for the kind hospitality which I found at Indiana University. I thank especially the Dean of the School of Education, Dr. Wright, and Mr. Seagers who arranged that I could meet so many important experts and architects of modern school buildings. I am very happy to be in the United States and to be able to study here the problems of modern architecture; and I am very grateful to the headquarters of the United States forces in Austria who invited many Austrian scientists and artists to make a studying tour. Especially for us Austrians who, since the beginning of the German occupation and the National Socialist government ten years ago, have been unable to travel in foreign countries, it will be a great event to see the development and the progress of architecture in foreign countries, especially here in America. It was a great event for us to study the first architectural magazines which came to Austria after the war about one year ago.

What I have seen during my stay in the United States has been very impressive, and I am sorry that my knowledge of the English language is not perfect enough for me to express all my impressions of the modern architecture in the States. Austrian architects esteem very highly the contributions of America toward the creation of modern architecture. In general, it is very interesting for me to see that many of the principles of modern architecture that were developed in the second part of the last century are becoming more and more important in the modern art of building, especially in the cities, where it is vital to the initiation of modern school planning. The contribution of Austrian architects in this field is not to be disregarded. I remember first the famous Viennese architect and theorist Camillo Sitte. His book concerning city planning was translated into the English language and was published a few years ago, I think by the Harvard University Press. I remember also many experts of modern education in Austria who had a great influence on school planning like Kerschbaumer, Czischek, Preahauser, Schneider, etc., and I think that the cooperation of educators, school experts, and architects is making possible the great progress in modern school building.

I have seen different schools under construction in the States—Philadelphia, Buffalo, and other cities—and I am now seeing here the designs of many schools from different parts of the United States. It is very impressive for me to see the high standards for school building and school equipment in this country. The experiments made with new lighting systems and with colors of rooms and blackboards, the perfect equipment of auditoriums and gymnasiums, the kitchens, etc., are very impressive to

me. From the point of view of school planning, I think that the ideas in Europe and America are quite similar. Most of the newest schools designed in Austria are schools of one floor, with classrooms open to a garden to make possible education in the fresh air. The schools are equipped with gymnasiums, bathrooms, etc. The equipment of the schools in Austria, of course, cannot be so perfect as in the States, because the costs of reconstruction of the war-damaged cities are so great that it will be impossible to equip the schools so luxuriously as is possible to do in the United States. The chief difference between American and Austrian school planning seems to be the lighting problem. In general, people in Austria do not like artificial light, and so we try to build the classrooms high enough and not too large, so that all desks have a good natural light. For the bigger schools, we try to develop the ground floor in a perfect functionalism. I am now planning with other architects a few new buildings for the Technical University in Graz. The laboratories are in different buildings, five or seven floors high, grouped around a large garden square. These buildings are united with second floor glass corridors. Between the high buildings are the different auditoriums, which are lighted from the sides and from the ceiling.

I am very interested in the new experiences I am having here in the United States, and I hope to return home with a lot of new ideas in modern planning. I think that the best ideas always come from international discussions of all problems, and I take this meeting as a token for a happier future when the scientists and experts of the whole world can discuss their problems together for the progress of humanity.

SCHOOLS FOR EFFICIENT TEACHING

ROUND-TABLE DISCUSSION

Presiding: RALPH BECKER, Superintendent of Schools, Evansville, Indiana
Discussion Group:

MRS. MARGARET MERCILLE, Critic Teacher, University School, Bloomington, Indiana
BEULAH E. BOOK, Art Supervisor, New Castle, Indiana
ALICE C. DEMPSTER, Supervisor, Meridian, Mississippi
RICHARD E. EMERY, Director of Distributive Education, Indianapolis, Indiana
KARL W. BOOKWALTER, Director of Bureau of Service and Research, School of Health, Physical Education, and Recreation, Indiana University

MR. BECKER: How would you build a school for more efficient teaching?

MRS. MERCILLE: First, I would take into consideration how young people feel about their surroundings. The surroundings should be more homelike, with facilities provided so the children can get a drink and go to the toilet with ease and convenience. The smaller children should have a place to rest when necessary. There should be more outdoor space, with easy egress from the building for all children, and with playground facilities which will entice learning. The outdoors is a place to learn and can be made so if properly planned. Little children need trees to climb and barrels to climb through and over. We need schoolrooms planned to take into their confines any of the advances of science which may come into our culture. All rooms should be planned for full utilization, and should also be convenient to clean. Interesting and beautiful spots should be placed in the room on the children's eye level.

We have various new ways of communication, so we must start at once teaching children how to use these things in order that they may become critical thinkers on the outcomes.

MR. BECKER: Speaking of beauty spots in a school, what can you tell us about ways of adding beauty to our schools for efficient teaching?

MISS BOOK: The rooms need to be finished in different colors to make them more livable. Pictures should be placed at the eye level of the children and not hung high on the walls. There should be bulletin boards for the children at their level of reach as well as for the teacher. The furniture can be arranged in an art center, science center, music center, reading center, and any other such center that has a purpose to serve and that will make the room more homelike. We don't live in one room in our homes, so why have everything in the same room at school? The children can help beautify the room by making drapes, pictures, and other fixtures for the room. The atmosphere of the room will be more homelike and natural.

MR. BECKER: What are some things which you consider important in the school for efficient teaching?

Miss DEMPSTER: I think the classrooms should have enough electrical outlets in different parts of the room to accommodate the movie projector, radio, television set, and any other teaching device which uses electricity. The classrooms should be well ventilated, so that, when the shades are drawn, one can still breathe comfortably. In the elementary school every room should have a drinking fountain, wash basin, and toilet. This is especially true for the primary grades; however, the toilets could be shared by two or three rooms if they are properly located. Every room should also have movable furniture, sufficient locker space, space to store the materials that are completed or are being worked on, book shelves, library space, and plenty of exhibit space. The teacher should have plenty of storage space for the many types of materials the children need in their work. I would like to see an auditorium large enough for all the children in the school.

Mr. BECKER: In regard to the health program, what do you think the school needs may be for efficient teaching?

Mr. BOOKWALTER: There are ten principles that are helpful in getting across a functional program of health, physical education, and recreation: (1) accessibility, in which facilities should be readily available to the proper groups in the student body and community; (2) beauty, in which the facilities should be attractive without gaudiness and should inspire appreciative use and treatment; (3) economy, in which the cost in time, money, and energy of the construction, and use and maintenance of facilities should be held to the minimum compatible with effective instruction and maximum recreational participation (set up the program first, then decide your economy and match the two); (4) flexibility and expansibility, in which an increase or decrease in the kind and amount of activities provided should be economically and readily accomplished by flexibility of the structure and arrangement, and should be expansible so that play space would not be taken by new buildings; (5) integration, in which the functionally related areas and groups should be brought together in integral units, suites, or departments; (6) isolation, in which the exclusion and elimination of odors, noises, dirt, and excess moisture from all areas concerned should be automatic and effective; (7) safety-hygiene sanitation, in which safety and healthfulness are primary considerations in the planning, use, and maintenance of facilities; (8) supervision and management, in which the facilities should be provided and arranged so that they may be economically and effectively supervised and managed, and under which the gymnasium, playground, and pool should not be utilized unless supervised; (9) utility, in which the maximum amount of activity should be provided by the minimum units of facility; and (10) validity, in which all facilities should effectively serve the specific purposes for which they are intended and should be in accord with activity needs, technical and legal requirements, state and local building codes, and official sports rules. The auditorium should not be in the gymnasium. The outside space for a program of health, physical education, and recreation should not be minimized. The recommended acreage for elementary schools is 10 to 20 acres, and for high schools it is 15 to 40 acres.

Mr. BECKER: What do you think the ideal size of a classroom should be?

Mrs. MERCILLE: The bigger the better, around 1,000 square feet would be ideal for a class of 35 children.

Miss BOOK: If at all possible, you should have an extra room for a workshop and activities room rather than have it in the same room. If the extra room is impossible, you should add more space to the room and have a portable workshop to take the place of a permanent one. The closet space for supplies should include ample room for the storing of 24" x 36" paper within reach of the children.

Mr. BECKER: What can you tell us about the place of distributive education in the schools for efficient teaching?

Mr. EMERY: A method of selling the community on the school system is through the distributive education program. This program came into existence through the George-Barden Law. It trains people to sell goods and services and develops more capable salesmen. Schools could have a distributive education laboratory equipped with such things as a selling counter, display counter, wrapping counter, movable furniture, plenty of chalkboard space, filing cabinets, bulletin boards, mannequins, cash register on wheels, mirrors, stock rooms, and storage space. Usually the industries in the community will donate many of the facilities mentioned, as well as others which can be utilized in this program. The bare minimum amount of space per pupil is 35 square feet. The more space provided, the more contributions by industry can be expected. The items which are donated are quite expensive, and usually prohibitive for the school to buy. The basic philosophy is to better the life of the community by turning out better salesmen.

Mr. BECKER: What other contributions do you have concerning your specific areas?

Mr. BOOKWALTER: The sizes of the playing spaces of most gymnasiums are inadequate. The minimum sizes should be: for elementary schools, 40′ x 60′ x 18′; for a combination elementary and community neighborhood building, 50′ x 80′ x 20′; for a junior high school, 65′ x 90′ x 22′; for a high school, 76′ x 110′ x 22′; and for a junior college, 120′ x 180′ x 22′. If you plan to put up a building to house more than one of the schools, you should use a lot of not less than the minimum size for the school that requires the largest play space. Included in the plans for a gymnasium should be provisions for sufficient locker space, toilets, and shower facilities. A health clinic should be available to the community, where children could be taken even when school is not in session, for example, at the summer round-up. This clinic should be included as part of the gymnasium unit.

Mrs. MERCILLE: Is the development of children's arm muscles being overlooked?

Mr. BOOKWALTER: No, equipment that will help in this development are the junglegym, highbars, and treehouse.

Miss BOOK: The art department is meeting this development in children by their work in ceramics. Another means is the making of things with their hands, as weaving with hand looms, for example.

Mr. BOOKWALTER: The art department should be planned so that it could be open for community use. Recreation is broader than physical

exercise, therefore adults should be able to participate in a community recreation program in which the art department can do its share.

Mr. EMERY: Another field in which I would like to see improvement is that of visual aids. I would like to see improvement in the sound treatment, ventilation, and lighting for this purpose. The circuits which usually run from the projector to the front of the room could be hidden in the walls, and the connections between the circuits and equipment could be made with plug-ins. The control over the lights should be simplified for these rooms.

Miss BOOK: The art department should be consulted in making suggestions for painting the rooms. I am sure that in many cases mistakes made in the past in the interior decorations could have been avoided if the art department could have had a say.

QUESTION: What are some of the trends in heating and ventilation for the gymnasium?

Mr. BOOKWALTER: The gymnasium heating system should be independent of the other school heating systems to avoid heating the whole school plant for an activity in the gymnasium when school may not be in session. The shower rooms, dressing rooms, and toilets must have unit ventilation to avoid mildew and offending odors.

Mr. EMERY: There is a trend for individual heating units for each room.

Miss BOOK: Every room should have its own thermostat.

Mrs. MERCILLE: I would like to see green chalkboards in a new school building, as well as a minimum of 30 square feet of space per child in the classroom.

Mr. BOSTON (Superintendent of La Porte schools): The trend is for eye comfort, as we no longer talk in terms of foot candles but in terms of foot lamberts. The brightness difference should not be greater than one to three for adjoining surfaces, and not over one to ten for light fixtures.

THE NEED FOR PLANNING SCHOOL BUILDINGS

by

DEANE WALKER
Indiana State Superintendent
of Public Instruction

IT is with great pleasure that I am able to take a few minutes from my busy life and say some words in regard to the planning of school buildings. As you know, during the next few years we are going to need considerable additional space to house our boys and girls. In fact, our elementary children are already overcrowding our school buildings. We cannot in Indiana avoid having a greatly expanded school building program during the next few years if we wish to take care of our school children adequately.

It is with considerable interest that I have listened to the panels ahead of me, for I know that boys and girls and teachers are thinking carefully and thoroughly about the planning of school buildings. Of course, we know that school administrators must be realists and that, although they want all of these desirable things in their school buildings, they must tailor the costs of those buildings to fit the pocketbooks of the taxpayers of Indiana. We must have the right sense of values in our planning and take care of the most immediate needs first. For example, even though we want to build a larger gymnasium, if there is a greater need for an elementary school, the elementary school should be built first. The people themselves must help determine the need for these school buildings.

While planning the building program, we must not lose sight of the fact that we need good school teachers in our school buildings. There is no substitute for good teachers, so I think it is our job to train our teachers the best that we know how and place them in adequate school plants of proper design and function built at a cost that we can afford.

In the past we have too frequently followed standardized patterns of construction. In fact, the outside of most school buildings tells what the inside will look like and within a year or two will even tell when the building was constructed. Both administrators and architects are at fault in erecting this traditional type of building and not giving more thought to what is to take place inside of the building.

Conferences like this will help us to get a better planned school building. I am very happy to see that pupils and some teachers have been invited to make their contributions to the conference. It is important that we take back to our architects many of the points that have been brought out in this conference. You administrators who have taken your time to participate in the conference will no doubt take back home with you many suggestions and ideas that will help you plan more wisely in the future. We people in the State Department of Public Instruction want you to feel that we are there to help you and not to act as police in any particular situation. That is the reason for setting up a new Division of Schoolhouse Planning, which Dr. Smith is so ably directing. Our offices and services are always ready for you. Kindly make use of them. Thanks for the opportunity for saying these few words.

EDUCATIONAL ENVIRONMENT FOR OUR CHILDREN

ROUND-TABLE DISCUSSION

Presiding: Mrs. JOSEPH W. WALKER, President, Indiana Congress of Parents and Teachers, Greenfield, Indiana

Discussion Group:

Mrs. O. C. REDENBACHER, Princeton, Indiana
Mrs. PHILIP REED, Indianapolis, Indiana
Mrs. LEONARD MILLER, Boonville, Indiana
Mrs. WILLIAM STRAIN, Bloomington, Indiana
O. H. ROBERTS, JR., Evansville, Indiana

Mrs. WALKER: There is very little in literature concerning parent participation in school building planning. Since every parent is interested in the health of the child, what provisions should be made for the health and safety environment of the school?

Mrs. REED: In regard to lavatories and toilets, some changes could be made in our schools that would answer some of our dreams right now. Toilets should be kept clean, and toilet facilities should be near at hand for the primary grades at least. In regard to lighting, one can go rather artistic in lighting, and this is not always the best thing for the eyes. The halls should be well lighted and properly ventilated, first from the health standpoint and second from a safety standpoint. There should also be adequate fire prevention and protection in the halls. Radiant heating should be given more consideration in the planning of buildings so as to eliminate radiators. I would also like to see an emergency first-aid room, with privacy for consultations and any first-aid that is given.

Mrs. WALKER: Mrs. Redenbacher, what are the trends in relation to school lunch rooms?

Mrs. REDENBACHER: Most school lunch rooms are make-shifts at the present time and are inadequate in that sense. The ideal situation would be to have an adequate lunch room kitchen (separate from the home economics room), with good lighting and with an outside entrance. The school lunch will some day become an integral part of school life.

In talking with people who run college dorms, it was found that boys and girls of college age have a fussy attitude toward eating. They are so critical. They should be taught in the elementary grades what one third of the day's requirement of food is, and they should be taught to eat what is placed before them. Proper facilities will be a help toward teaching children proper eating habits.

Mrs. WALKER: What should be done in planning for the use of the school plant as a community center?

Mrs. MILLER: I would like to see a parent-teacher room or community room in our schoolhouses. This room should have an outside entrance, so that it can be entered without disturbing the school. Provisions should be made for such things as a canning center for community use, or for other types of rooms which the community feels the need of. I would also like to have a swimming pool in the gym, with facilities for teaching

swimming to all children from the junior high school up.

Mrs. WALKER: Mrs. Strain, will you give us your ideas on meeting the educational needs and facilities of our children?

Mrs. STRAIN: I would like to see the children have plenty of space. However, this is not as important as other things. The fundamental needs of children should be understood by the planners of buildings. They have mental, physical, and social needs which must be met. When the small child first enters school, he looks to the teacher to substitute for his mother. We should have a full-time nurse and part-time doctor to look after the health needs of the child.

I think there is need for the teaching of more fundamentals in the fifth grade and above. There also should be a place in the school's program where the child is taught to "take it" as well as to "give it."

I would also like to see parent-teacher rooms for meetings.

Mrs. WALKER: Mr. Roberts has had some experience with parent-teacher relations, so maybe he would like to enlighten us in this field.

Mr. ROBERTS: We need to agree on certain fundamentals about the things we would like to see in school buildings. First, we must remember that schools are created for the purpose of training our young people. Too many times they are the only real home the children know. We have to want something for the schools pretty badly before we can hope to get it, and the school board must be sold on it. We need to have a great deal of good public relations. If your school board is aware of the community pulse and has expert technical advisers to consult with, you will get a good school plant and environment. Your school buildings and plants as well as curriculums are only going to be as good as your community wants them. Therefore, it is necessary to sell the people on a belief in the things needed in a school by developing within them the feeling of being a part of the school. If the need for a building program is seen and the idea is sold well to some, they in turn will help sell the idea to others. The teachers and administrators must be open-minded in their salesmanship. It is the responsibility of the P.T.A. and other community-minded organizations to help sell the educational plans, as the building program is a cooperative enterprise.

The P.T.A. room should be used as a place for developing closer relationship between the parents, teachers, and schools, and not just a meeting place for the P.T.A.

Suggestions by outsiders will always be accepted by planners if they are constructive.

Mrs. REDENBACHER: There should be plans for a community camp in the planning for indigent children.

Mrs. REED: You should be sure that the community is allowed to do its own thinking. The individual community needs should be considered above everything else.

Mrs. MILLER: There needs to be adequate equipment in the school building for audio-visual education. There should be facilities in every department, if not in every room, for audio-visual teaching.

Mr. ROBERTS: If we can help our community take the attitude that we want the very best for our young people, then we can do a job in school

planning. We should not employ just any architect, since we want a plant built around a purpose. The problem is to sell the building program to the school board with the idea that the building should be built to fit first the program and then the pocketbook.

Mrs. WALKER: In our future planning we should be mindful of library facilities, and we should inform our people of the need for better buildings.

There is a great deal of talent and interest in every community that is there for the asking if the opportunity is provided for people in the community to come forth and meet with those making plans for the school buildings. The viewpoints of the parent and the teacher are the same; that is, the child is the center of interest in the program.

Dean WRIGHT: Is there a trend toward the feeding of one meal a day to all children?

Mrs. REDENBACHER: The trend is toward that, toward making the school lunch an integral part of the school system. The new school building should have the cafeteria planned as a part of the school building.

Dean WRIGHT: If the trend is toward feeding every child one meal a day, we must plan our buildings to provide for this properly.

MEMBER OF THE AUDIENCE: We need to have an educational program, with the emphasis put on serving rather than feeding.

In Europe there is an appreciation of the fine side of eating. It is a side of our educational picture which we do not give to our young people in our everyday hurry-up life.

When the school lunchroom is sponsored by the various clubs, there seems to be a feeling between school administrators and the sponsoring group that is not completely harmonious. When the school lunch comes to be a part of the school system and is administered by the school officials, it seems to run more smoothly.

Mrs. REDENBACHER: The children need more adequate rooms for vocational training.

Mrs. WALKER: In conclusion, I wish to state that, as a parent-teacher organization, we believe in better housing and in providing clean, well lighted, comfortable, and adequate buildings where education can be at its best. Modern education has its focus upon the child. The school must provide an opportunity for the child to participate in graceful and purposeful living. This aim is not solely that of the parent-teacher organization, it is not a thing apart from the desires of parents, but, rather, it is a continuation of their plan of education for living. We look forward to being invited to participate in planning. We recognize the importance of planning for new structures and for remodeling old buildings. We anticipate an opportunity of sharing in the responsibilities of building better and more practical educational units.

LET'S MAKE SCHOOLS LIVABLE

by

PAUL W. SEAGERS
Assistant Professor of Education
Indiana University

As we look back upon the monastic austerity of the school rooms we studied in and demand more livable schools for our children, we must fully understand the connotations of the word "livable." Livable suggests environment for living. Living suggests action or movement and, according to our present-day psychology, action or movement of the organism as a whole. This means that, to be livable, schools must provide the proper environment for desirable action and growth of the whole child, socially, emotionally, physically, and mentally. For this, functional planning, or planning "from the inside out," must take place, not on the adult scale but in accordance with the maturation of the proposed occupants. It is true that we want beautiful school facilities, but that does not mean ornate edifices frequently constructed to perpetuate the memory of a local citizen or to bolster community pride. Beauty can be obtained from a realistic combination of simple details, color and mass of humble materials assembled in an appropriate setting or environment.

Too many times we have blamed the architects for strait-jacketing our school programs today, when we should have blamed the school officials for not cooperating with the architects and furnishing them with the functional specifications which they needed to design the desired educational, recreational, and community areas properly. Let's face the issue squarely. The architect is a many-sided person; he is a dreamer who must visualize his proposed creations; he is an artist who must transfer his visions into the language of sketches, elevations, and perspectives which others can understand; he is a technician who knows materials, their uses and limitations; he is an employer of many types of specialists; and, last but not least, he is the practical man who makes contracts, interprets details, and generally supervises the actual construction of the structure. Would you expect him also to keep up with the latest philosophy and psychology in education when the school administrators themselves have difficulty in keeping up?

Some of the best buildings, educationally, have resulted from the cooperation of school authorities, school employees, citizens, and even pupils with the architect in visualizing what should take place inside the educational plant of the future. Discussions, notes, sketches, and pictures from advisory committees form the functional specifications which the architect, with good judgment, can interpret into adequate plans and building specifications. Instead of designing a structure and dividing it up into classrooms, he will study areas, grouping those areas which are related, isolating those areas which need isolation, and eventually

surrounding the areas with properly designed walls, roofs, and floors, and with the provision for necessary services.

With proper consideration of the age and emotional reactions of the proposed occupants in planning school buildings, perhaps it will be no longer necessary for mother, like the Pied Piper of Hamlin, to entice little Johnny into the cave-like entrance of a mountainous school structure. Instead, we may find little home-like school rooms with small artistic entrances to beautiful gardens, play yards, and play rooms. I have never taught art, but I do know, from experiences in my own school buildings, that art is much more easily taught in school plants artistically but simply designed and situated on sites properly shrubbed and landscaped than it is in the majority of our school buildings—buildings which are large and ornate beyond the comprehension of the youthful mind, or austere to the "nth" degree, and situated on small plots with the buildings completely surrounded with gravel or black top. In the former type of building, a genuine feeling for art is acquired by living with it, while in the latter type of building, art is learned only through the ingenuity and persistence of the teacher, with the school plant exemplifying the negative side.

For the school beginner to be suddenly withdrawn from a small neighborhood group of playmates and thrust into the center of a large group of active, pushing, strange boys and girls in our large elementary schools can be emotionally upsetting. Why, even nature does not behave that way. A pebble dropped into a pond of still water results in a series of successive concentric waves expanding outward from the point where the pebble entered the water. We do not find a jump from the first small circle to the largest possible in the pond. There seems to be a gradual incorporation of each successive wave into the total pattern. Why can we not build schools and run them so that there can be a gradual meeting of children with larger and larger groups. This would result in extension of friendships and acquaintanceships rather than in the engulfing process now frequently prevailing.

The change from the fixed-seat philosophy to the movable-table-and-chair philosophy or from the mind-goes-to-the-classroom philosophy to the philosophy that the child learns as a total organism necessitates an upward revision of the amount of floor area per child from 15 square feet to about 30 square feet. Thus, a 30-pupil classroom should contain a minimum of 900 square feet. To get 900 square feet with the present accepted width of approximately 22 feet, necessitated by the conventional natural lighting standards, would mean a long-hall type room of more than 40 feet in length.

We already have problems of seating pupils in a classroom so that they are not hampered by the glare from the windows towards the front of the room. Lengthening the room can intensify these problems. Classrooms of even more than 900 square feet can be made very homelike and livable by various methods, such as making them more nearly square; using some type of bilateral lighting, such as clerestory or monitor; and breaking the floor space up into various work and play areas by means of alcoves, counters, screens, book and display cases, and partial screening walls of glass block, Alsynite, and other materials.

In the last few years some schools have given some attention to the child's visual environment in terms of quantity and quality of light, with emphasis upon a high reflection factor paint to "make the light work," but very little thought has been given to the selection of the proper colors for various activities and areas. It is time that we give various areas, even in the same room, different color treatment according to the activity taking place. Why should the work alcove, or the clothes closet, or the reading nook have to be painted the same as the rest of the classroom? Why can't the inside of cabinets be painted orchid, blue, or some other nice color? Insides of bookcases need not be painted the same as the outside. Even classroom walls need not be painted alike in order to get the proper reflection to "make the light work," as well as the proper colors for the orientation of the room and for the type of artificial light provided in the room. We have had several decades of institutional dirty browns and bilious greens; now let's not institutionalize blues, light greens, and other tints by making them predominate in any situation. Otherwise we will get to despise them like we do the dark browns and greens. We can eliminate the eye fatiguing brightness differences in a room by getting light furniture, light window shades, light colored chalk boards, light trim, and light floors. The old dark furniture can be refinished; the dark green filing cabinets can be repainted; the chalk boards can be refinished. It is not necessary for darkening shades to be dark in color—they can be light in color and opaque for darkening purposes.

The problem of artificial lighting is facing many schools. The desirable standards of intensity of illumination have more than tripled in 25 years. But this does not mean that we can continue increasing the intensity of light in a classroom without improving the quality. In fact, increasing intensity without improving quality can jeopardize the entire balance of brightness within a room. Thus the type of lighting, as well as the color and brightness of all the surroundings in the room, must be considered. We have found machine shops in some industries providing eight to ten times the quantity of light on their machines as that provided on the same types of machines in the local schools. We have also found bar rooms and cocktail lounges providing a higher intensity of illumination according to law or local ordinances than that found in nearby school rooms. Has the public been too reactionary (another way of saying have we had poor public relations); has the administration been ignorant of the latest trends; or have we all been too blinded by the dollar sign to think of the welfare of children and the livableness of schools?

To make schools livable, we must provide good ventilation. In some cases this can be done by the proper arrangement of well designed windows. In other cases it may mean more expensive mechanical ventilation or a combination ventilation and warm air radiant heating system. In many areas it certainly is not necessary to bring in 30 cubic feet of fresh air per person per minute, as provided for in some statutes, when 10 cubic feet per person per minute will do. Neither is it necessary to provide a central fan system for recirculating 20 cubic feet of air per person per minute. Unless there is excellent filtering of the air, this latter system just gathers up the dirt and germs from all the rooms, mixes them up

well, and redistributes them. Air movement within a room can be obtained by unit and wall-hung fans.

More study should be made of various methods of providing the proper amount of tempered fresh air to school rooms. Uniformity of heating within a classroom has been a difficult problem from the days of the chunk and pot-bellied stoves down to the present days of radiant heating. One of the problems is the lag in the heating system, especially those using hot or warm water, in meeting changes in weather conditions outside. This is helped to a great extent by using an out-of-doors stat which makes a change in the heating system before the effects of a change in weather have been recognized inside. Another problem results from the sun shining through the windows. As the sun shifts, so that more direct rays enter the room, there is frequently a need for cooling rather than heating, even on cold days. If the room is cooled by bringing in cool outside air, the problem of air tempering and proper air diffusion must be solved to preclude stratification and pouring of cold air down the necks of children. Likewise, each child is a small heating plant in himself and, after the start of school in the morning, there can easily be an abrupt change from a problem of heating to one of cooling. In cold weather, if the temperature of the building is dropped at night to the point where the walls cannot be properly warmed when the children enter in the morning, there is a very uncomfortable drafty feeling for those near the cold outside walls. Many of you have experienced this feeling in front of cold windows. To make the room comfortable and livable, the walls of the school building should be kept warm over night, and over the weekends and winter vacations in northern climates.

In the matter of sanitary facilities, let us provide the little folks with the types of fixtures they find at home, except in a smaller size (never larger than a junior size water closet, which is two inches lower than standard, for any school toilet). In the second or third grade, urinals may be placed in the boys' room toilets and in higher grades the children can be sent to larger group toilets. The lavatory can be placed in a nook in the classroom or outside the door to the toilet for the room. Proper size work benches and sinks can be given their own alcoves or can be given proper treatment to harmonize with the rest of the room. Drinking fountains are musts for all grade school rooms.

The storage of supplies in each primary room is more complicated than in many high school rooms because of the variety of types and sizes of supplies. Insofar as possible, each primary room should be able to store four to six months' supplies. Supplies that children are allowed to get, and that should mean most of them, should be stored so that the children can easily reach them. Large sizes of paper should have large shelves, tools should have proper racks, nails and screws should be in portable trays, and paint brushes should have the proper containers.

The workshop area floors should be of materials not easily damaged, and small tarpaulins should be provided for painting sessions. Some parts of the walls should contain removable cellotex sheets upon which pictures and murals can be painted by the children. In many sections of our country, outdoor work and play areas should be provided adjacent to

the classrooms. These should be combination courts and gardens partly in the sun and partly in the shade. Many of the activities now taking place in the classroom could easily take place in the healthful out-of-doors.

We talk about learning from our environment, yet how short-sighted we have been in providing a child's environment in our schools. Let's get a child's eye view of our buildings. Let's study the progress made by others. This does not mean that we should copy, but we might find many things we could adapt to our situations. Take a good look at the campus schools of England and the new *schule* complexes we developed in Germany; the *pausen platz*, *pausenhalles*, and *schule gartens* of Germany and Switzerland; the nursery schools and kindergartens of Sweden; the technical schools of Denmark; the out-of-door theaters, single-loaded corridors, and little campus school rooms of Mexico City; as well as recent developments in community schools, new roof designs, one-floor plans, single-loaded corridors, and radiant heating right here in this country.

Sure, costs are high and money is scarce; but if schools are the backbone of our highly efficient industrialized society and are the first line of defense against communism that we claim, the American public (labor, capital, business, and the professions) will rally and provide the necessary means for constructing new school buildings. Now is the time to get all groups cooperating; now is the time to make preliminary studies; now is the time to re-evaluate our school building codes; now is the time to plan livable schools for live boys and girls.

GREETINGS FROM THE STATE DEPARTMENT OF PUBLIC INSTRUCTION

by

HENRY LESTER SMITH
Dean Emeritus, School of Education, Indiana University,
and Director of School Buildings,
Indiana State Department of Public Instruction

ON behalf of the State Department of Public Instruction of Indiana, I am happy to join in extending greetings to the Indiana and Midwest School Building Planning Conference and to express appreciation of the values that will come out of the deliberations of this body of officials interested in the practical solution to pressing school building problems.

As early as 1881 the Indiana legislature expressed its interest in the improvement of schoolhousing conditions by passing the sanitary schoolhousing statute. Since that time, by added legislation in 1899, 1909, 1913, 1917, 1929, 1931, 1937, 1945, and 1949, provisions for improving the school plant conditions have been gradually strengthened. As early as 1923 the position of Director of Schoolhouse Planning was created in the State Department of Public Instruction, on a part-time, temporary basis. This position lasted for a two-year period, during which time an unsuccessful effort was made to get legislation that would permanently establish such a division, a division that could be continuously helpful to communities in the improvement of the school plant and other phases of the public school program. In the fall of 1946 a consultant on School Building Construction was added to the staff of the State Department.

In the meantime, the state was not neglectful of its responsibility in this field. One state agency after another was either created to deal with some phase of this problem or had such duties added to its already existing responsibilities. Among these agencies covering the fields of construction and safety were the State Board of Health, the State Fire Marshal, and the Administrative Building Council. Until 1949 there remained a significant gap in these provisions in that no adequate supervision of the school plant from the purely educational point of view had been cared for. In an effort to fill in the absent link in the previous chain of provisions, the 1949 legislature passed an "act concerning school sites and buildings, defining the powers and duties of the Commission on General Education in relation thereto, creating a Division of Schoolhouse Planning and declaring an emergency."

By this act the Commission on General Education was directed to "adopt and promulgate such rules and regulations as it should deem necessary and reasonable concerning the adequacy of all new school sites and buildings or any modification of or addition to existing school buildings as will meet the demands of an efficient and successful educational program for the state and its various communities." For the purpose of

carrying out the provisions of this act there was created within the State Department of Public Instruction a Division of Schoolhouse Planning with duties that might be assigned to it by the Commission on General Education.

A director of this division has been appointed by the State Superintendent of Public Instruction. I feel honored in having been appointed to this position. I am happy to report also that the State Superintendent of Public Instruction has appointed an advisory committee of school superintendents and school building experts to advise with the Division in recommendations that the State Superintendent will make to the Commission on General Education in regard to rules and regulations governing schoolhouse planning.

The following individuals have been invited to serve as members of this advisory committee:

Supt. Orville J. Hooker
Marion City Schools
Marion, Indiana

Supt. Custer Baker
Johnson County Schools
Franklin, Indiana

Supt. Merle J. Abbett
Fort Wayne City Schools
Fort Wayne, Indiana

Supt. Cecil A. Grayson
Lake County Schools
Crown Point, Indiana

Supt. George W. Gerichs
Pulaski County Schools
Winamac, Indiana

Supt. Harry H. Mourer
Bedford City Schools
Bedford, Indiana

Supt. Edgar P. Williams
Benton County Schools
Fowler, Indiana

Supt. Earl L. Wood
Alexandria City Schools
Alexandria, Indiana

Dr. George H. Bush
Purdue University
Lafayette, Indiana

Supt. Keith Scott
Elwood City Schools
Elwood, Indiana

Dr. Paul W. Seagers
Indiana University
Bloomington, Indiana

The Division of Schoolhouse Planning will center its activities on three phases of school plant planning:

1. Evidence of need for modification or addition to the school plant.
2. Adequacy of site for the anticipated enrollment and for the educational program contemplated.
3. Arrangement of building and plot space from the point of view of efficiency and success in carrying out the educational program.

Other phases of school plant planning are taken care of by other state agencies provided for by previous legislation.

Again may I express, on behalf of the State Department of Public Instruction, appreciation of the presence in our midst of a working group interested and competent in the school plant field. We look forward, with confident anticipation, to the helpful suggestions that will result from this conference.

DESIGNING AREAS FOR LEARNING

by

JOHN H. HERRICK
Bureau of Educational Research,
Ohio State University

THE wording of the topic which has been assigned to me is both challenging and significant in that it focuses attention upon the school plant as a device for helping the pupil to learn. This emphasis, as all of us would agree, is quite proper, since a building of any kind should be designed to facilitate the activities it is intended to house. A clothing factory should be planned to expedite the making of clothing, a railroad repair shop to promote prompt and efficient repair of cars and locomotives, and a school building to promote learning.

This principle seems so axiomatic that it would be a waste of time to discuss it, except for the fact that there have been and still are many school buildings being designed with too little detailed analysis of the educational program and its implications for school plant design. There are, in fact, a few people who would still defend the proposition that a school building should be designed with first attention to external, aesthetic considerations. Fortunately, the number of such people engaged in schoolhouse design is rapidly diminishing.

Many an architect, knowingly or unknowingly, has been blamed for the inadequacies of a building which in some of its particular features makes it difficult to engage in some desired educational activity. More judicious consideration of the case would, I am sure, in many instances lead to the conclusion that it is the educator and not the architect who is at fault. It is our job as educators to do detailed educational planning in connection with any school building project; it is the architect's responsibility to arrange spaces and to enclose and equip spaces to facilitate the educational activities which are thus determined to be desirable.

The role of the educator in planning a school building is to analyze both today's practices and those practices which are likely to prevail in the future. This is a task which requires not only a comprehensive knowledge of the practice of education, but also familiarity with the implications of various practices and trends for school plant requirements. The person who undertakes to provide such service in connection with the planning of a specific school building must also be sufficiently familiar with architectural matters to enable him to prepare the educational specifications for the building in terms which will be most helpful to the architect. This is in no sense meant to imply that the educator should provide solutions to architectural problems. On the contrary, there must be maintained a clear separation of functions between the educator and the architect. Neither is competent to practice in the area of specialization of the other. While they must work closely together, the educational

planner and the architectural planner must each be independently responsible to the board of education for the faithful performance of his own particular set of duties.

It is possible that the educational planner could be the superintendent of schools, or some assistant superintendent, principal, or teacher, and that a considerable measure of success might be achieved by such a person. There is, however, a large and growing body of "know-how" in the educational planning of a school building. There are certain questions of educational policy and practice which must be raised and answered. There are established techniques of determining the number of rooms of each type which are required in the building, and there are procedures which are known to be effective in setting up the educational specifications in ways which will be most helpful to the architect. The "know-how" required for effective educational planning is more likely to reside in an experienced educational consultant than in a superintendent or other employee whose major concern is with other aspects of education and who is likely also to have other duties that will prevent him from devoting adequate time to the educational planning of the new building. The impact of a poorly designed building on the educational program for a half century or more is such that no superintendent and no board of education should be satisfied with anything but the best in educational planning and in architectural planning service.

In planning for today's needs and those of the immediate future, the educational consultant must consider first of all the age groups to be served and the general nature of services to be offered. Will kindergartens be a part of the program, and what about nursery schools? Will the high school be extended upward through the thirteenth and fourteenth years, or will there be a separate junior college? Will adult education classes be provided, and in what subjects, and for what groups? Will the board of education undertake to provide space for public gatherings, for public library use, for a community cannery, for a public recreation center, or for a health clinic? These are basic questions which must be answered in the early stages of educational planning, and the educational consultant will seek authoritative answers to them from the board of education.

Once it has been determined what services are to be provided, it is essential that careful analysis be made of the manner in which these services are to operate. Such questions as the following must be raised and answered: What subjects will be offered at each grade level, and how many pupils will be enrolled in each? To what extent and in what manner will there be departmentalization of instruction at each grade level? In what size class groups will pupils be taught? What will be the daily schedule? What methods of teaching, or, better, what types of learning activities will characterize the instructional program? In this analysis, it is important that athletics, clubs, student councils, and other nonclassroom activities not be overlooked as important instructional devices.

It is with answers to questions such as these that the educational consultant develops a program of requirements for the guidance of the architect. The term "program of requirements" is used to mean a docu-

ment listing for the architect in definite terms all the facilities to be provided in the building and the general characteristics of each. It is to be understood, of course, that, while an educational consultant may be given responsibility for the development of the program of requirements, it is the board of education that must officially adopt and transmit the document to the architect. What is contemplated is an arrangement whereby an educational consultant and an architect, while working closely together in some aspects of the total project, are individually responsible to the board of education in their respective fields.

At Ohio State University the Bureau of Educational Research, through its Survey Division, has for several years made available to boards of education the services of an educational consultant to assist them in the planning of specific building projects. I have been asked to discuss particularly the procedures used in connection with this service of the Bureau. Since each project must to some extent be tailored to fit the particular need, I shall give you a generalized description which will better illustrate the basic principles than can any description of some one project.

The first major step, following completion of the arrangements with the board of education, is to prepare and send to the superintendent of schools a detailed memorandum. The first purpose of the memorandum is to solicit from the superintendent certain information needed in connection with the educational planning of the building. Data are requested which will be needed in a forecast of future enrollments, which describe the present course of study and the status of changes previously considered, which indicate the enrollments by courses and the trends in such enrollments, and which give similar basic information. The second purpose of the initial memorandum is to advise the superintendent relative to the organizing of the staff committees which the educational consultant and the superintendent have already agreed upon as needed to assist them in the particular planning job at hand.

As soon as the requested data are furnished and the staff committees established, the educational consultant meets with the superintendent and all committee members in a joint meeting. At this time the educational consultant defines in some detail the functions of the committees and gives rather complete instructions and suggestions as to procedures. These instructions and suggestions are to some extent in mimeographed form.

At least a month, and preferably longer, is allowed for committee work. During this time each committee meets and prepares for the educational consultant detailed suggestions within its own area. The list of committees will vary somewhat from one project to another, depending upon the job to be done, the size of staff, and other local factors. By way of example, separate committees might be appointed to make suggestions regarding kindergarten facilities, lower grade classrooms, upper grade classrooms, science classrooms, assembly rooms, and facilities for audio-visual aids. Outside the strictly instructional field there might also be a committee on lunchroom facilities and one on janitorial facilities. These

latter committees should, of course, be composed largely of non-instructional employees.

Each committee is asked to submit its suggestions in writing to the educational consultant, following in general an outline of content previously furnished. It is the responsibility of the educational consultant to combine these various reports, harmonize them where there are divergent opinions, and combine the various committee suggestions into a single coherent report.

While the committee work is in progress, the educational consultant is analyzing the data submitted by the superintendent. This analysis involves the estimating of future enrollments and the calculating of the number of rooms of each type which will be required in the proposed building. At least in the case of a high school building, this culminates in a separate mimeographed report on room and space requirements.

The educational consultant at this stage has at his disposal the combined and coordinated committee reports and the calculated room and space requirements. With these two bodies of data, he must then proceed to formulate some tentative program of requirements in the light of an over-all educational program and in keeping with the financial resources available. It is at this stage that some of the expressed desires of committee members must be denied, that some combination rooms for multi-purpose use must be contemplated, and that similar decisions must be made. The job at this point is one which is certainly not easy, nor is it one which causes many words of praise to be directed toward the consultant. It is, however, inescapable, since it would be neither educationally nor financially sound to plan a building primarily by adding together all of the requests and suggestions of any staff.

This phase of the work culminates in a tentative program of requirements, which is then presented for consideration to a second joint meeting of the members of all the staff committees. At this time, the deletions and changes made by the educational consultant are pointed out and explained, and many questions regarding the tentative program of requirements are raised both by the staff and by the educational consultant. Some changes are agreed upon at this time, and others are taken under advisement for more detailed analysis by the educational consultant.

Following the second meeting with the staff committee members, the educational consultant makes such changes in the program of requirements as are needed and then presents the revised document to the board of education for analysis and criticism. Changes are again made as required, and the program of requirements is then put into final form for adoption by the board of education as a part of its instructions to the architect.

During the architectural planning of the building, the educational consultant is available as needed for conferences with the architect. In these conferences the program of requirements is further interpreted to the architect and sometimes modified in the light of architectural considerations. Preliminary plans of the architect are reviewed in terms of their conformity to the program requirements and of commonly accepted criteria of a good school plant. Obviously, the relationship between the

architect and educational consultant must be wholeheartedly cooperative if the best results are to be obtained.

When the architect's preliminary or basic plans are presented to the board of education, the educational consultant is present to advise the board of education in regard to them. While the architect and consultant are usually in agreement, it is understood that they are independently responsible to the board of education and that it is the duty of the consultant to point out any significant differences of opinion.

While there may be some occasional conferences after the board of education approves the preliminary or basic drawings and specifications of the architect, the work of the educational consultant is largely finished once the architect starts to develop his working drawings and specifications.

Before closing, I should like to point out a few basic principles which underlie the procedures described. First and foremost is the principle that a school plant should be designed in terms of specific educational specifications developed by educators. This has been implicit in my whole discussion.

A second implied principle is that the people who will use the new building should share in the planning of it. This is true partly because the building will be better because of such participation. Teachers, custodians, and others who use a school plant are certainly in a position to know in considerable detail the strengths and weaknesses of existing buildings, and thus to make helpful suggestions for a new structure. Moreover, it is thought that there will be more intelligent use of the new facilities to further an improved educational program if the staff has shared in the planning of the new building. Certainly there would be little point in planning and equipping a building for a type of educational program which the staff does not understand and will not put into operation.

A third and final principle is that the planning should at first be on an idealistic basis, even though it is known that available funds will later force some curtailment. If the cutting process is not started too early, it is not unlikely that some desirable features can be retained which might otherwise be lost, or that inexpensive provisions can be made at the time of initial construction for the later addition of certain facilities that are out of reach at the time of initial construction. This procedure can be followed without detriment to the staff morale if the whole staff is fully aware that cuts must be made and if they have an opportunity to review the tentative program of requirements before it is presented to the board of education.

The effectiveness of any such procedure as described will depend in no small measure upon the leadership of the superintendent of schools. He must organize early for such a program, so that there will be ample time for the maturing of judgments and possibly for some experimentation before final decisions have to be made. He, too, must keep clearly before the staff and the board of education the conditions under which the educational planning service is being done and the respective responsibilities of all parties involved.

In closing, let me leave this one thought—if the educational planning

of a school building is not done by the educators, many questions of educational policy and practice will be answered incidentally and with considerable finality by the architect as he prepares drawings and specifications. With all due respect to the architect as an expert in the field of architecture, educational decisions which will affect so vitally the lives of thousands of pupils for a half century or more should not be made except by careful analysis and study by experts in the field of education.

LOOK WELL TO YOUR PLANNING

by

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Mr. Chairman and friends of education, "Look well to your planning." The boys who planned a number of years ago thought that they were looking well to their planning. I think that they probably were. When one reviews today the work that was done by a coterie of very famous architects who began to win their fame at the end of the first decade of this century, one is surprised at what they have achieved. Look at the work of Will Ittner, Larry Perkins' father, Cooper of Boston, Snider of New York, Gilbert of Newark, Jack Donovan on the west coast, and others, and you will find that they concentrated upon good school buildings and thought that they were making distinctive contributions, and no doubt they were. If you could turn back to the meetings in which they participated about 40 or 50 years ago, you would find that most of their discussions centered around materials of construction, methods of mechanical ventilation, better systems of lighting, and the full acceptance of the achievement of modern plumbing, but very little emphasis was placed upon education as we know education today. During the period in which these men lived, professional education had not reached its present height.

Now let us go back in thinking of our profession to about the middle of the 1890's. Here we will find that a group of American educators like Thorndike, Cattell, and Frank McMurray and his brother, after studying in Germany for a while came back to this country and established a new approach to education, an analysis of education which developed into the statistical method. They invented measures which they applied to all the processes of education. They questioned the underlying philosophy and theory of education, and slowly but surely there emanated from their efforts tremendous achievements in professional education which flourished considerably in the late 1920's. These achievements still continued to mount after the late depression, and even after the last war. As a result, our knowledge about what constitutes good education, what constitutes learning, and what methods of teaching are best has been greatly increased. Out of all of the study and research that started about 1890-95 we have received certain appreciations which stand out definitely and prominently—the sanctity of the individual, the understanding that individuals grow at different rates and have different abilities, and the realization that mass education as we have known it in the past did not train for democratic living because it expected all children to learn the same thing at the same rate and with the same results.

Most of the building that was achieved by Billy Ittner, Jack Donovan, and the others I have mentioned before, was based on a theory of education that we have discarded to a very large degree. We have thrown aside

the concept that the teacher is the lord of her domain, and that all people within the classroom or within the laboratory must follow the same procedures and pursue knowledge according to the whims or desires of the teacher. We are rapidly discarding that theory and are giving more consideration to the individual. We have found that small groups provide better teaching situations than large groups. Small group teaching has achieved phenomenal success in the kindergarten and first and second grades, and is even recognized as the best type of teaching in the high school. With this change in view, if we were now to look over the buildings designed by the very competent architects mentioned above, we would be inclined to say that they are obsolete, and they certainly are obsolete. But, if you were also to review the theories of education at that time you would say that they, too, are today in a very large measure obsolete and that their processes are being superseded by those that are far more acceptable to our generation of living beings.

Now what I wish to bring out is that no matter how well we do a job today we are going to have a generation of people 30 or 40 years hence who will look at our work quite differently from the way we do. They will probably wonder why we have not planned more flexibility in our school buildings when, after all, flexibility is one of those ghost terms that we follow, try to grasp, and cannot quite find. They are likely to say that we have not done a very good job of making better adjustment to the needs of the day. So, while in this process of planning, we should review the tendencies in education over the past 50 years, learn from the mistakes of the past, and direct our thinking to the adjustments of individuals.

It is important to consider the fact that we Americans like the out-of-doors, and we are going to use the out-of-doors to a far greater degree than we have in the past. In fact, insofar as schools are concerned, we have not paid too much attention to the out-of-doors, but from now on we are going to ask for more land. We are not going to place these schools on small pieces of land in the center of the towns in such a manner that they cannot be added to or provided enough play area for the occupants of the building. Those early settlers had no conception that high school education would be as extensive as it is today. We will be criticized severely, but rightly, if we continue to plan combination gymnasiums and auditoriums without giving more attention to the adequacy, efficiency, and elements of comfort desired for human beings today. No doubt it will be said that we were not aware of movements that began way back there in the 1920's and were quite clear in the 1930's and 1940's when we drew up the sketches and plans of our new buildings.

The point to this is that we have had two professions that are trying to serve a common end, the educational profession and the architectural profession, and both professions in the past have not had adequate training for the service that they expected to render to the public. In the old days the architect was given his commission by the school board, and the architectural profession itself assumed that the architect could make all of the adjustments necessary in planning a building for education. In fact, my dear friend Billy Ittner, when he accepted the commission from

the board of education, used to say, "All right, I can plan you a high school building for 1,200 or 1,800 or whatever you want," and somehow or other his planning was exceptionally well done. But if a member of the school board would attempt to go into the building before it was turned over to the board he would quickly say, "You get out. I'm in charge of this building. This is my job."

You see, the architect was supreme in those days. That has now changed; the architect cannot be supreme in the planning of school buildings today because of the rapid changes in education and the need for a cooperative type of relationship in which both architects and educators must service society. Certainly the architect knows full well that his training in the interpretation of educational practices has been very limited. Most deans of schools of architecture are looking forward to the day in the training of architects when they may have the opportunity of experiencing good educational planning early in their training. So we have these two groups trying to work together to get a product that will fit society, not for a limited amount of time, but for a long period of years.

It is really quite unfair to society to suggest that we are going to build for only a period of 5, 10, or 15 years. We know that cannot really be done. All over the country there are so-called portables or temporary buildings which have stood alongside of very fine structures for the past three depressions. Promises were made that during the next good time, when money was a little easier, these portables would be replaced, but they are still there, and generation after generation of childhood have had to pass through those buildings without a fair chance. These children have not been getting all the opportunities that are found in a well planned elementary or high school.

It is true that we must plan for a long time, perhaps for several decades, and that no one single individual has the power of seeing into the crystal ball and determining what is going to take place in the future. Nevertheless, there appear to be trends in our social and professional areas which can be used as directives for future planning.

Let us look at a few of the trends with respect to society as a whole. I am sure that the process of centralization of populations in our cities will have an effect upon the kind of planning that must take place for school purposes. In most cases, schools today are being placed on the outer periphery of settled areas rather than in the hearts of the cities. Probably the hearts of the cities are not being given enough consideration, enough fair play, or enough justice. That is where the substance has been and that is where the money has come from for the support of school programs in the past.

In the past, it was possible to argue for separate high schools for the sexes, and many argued for different schools for different curriculums. Schools in Springfield, Massachusetts; Providence, Rhode Island; and Hartford, Connecticut, are very fine illustrations of school systems where these differentiations were used as the basis for planning different types of schools, and human beings were segregated on the basis of that rather precarious division of the curriculums. Today, with the exception of a few places like New York City, you cannot argue for separate types of

schools. You have to argue for comprehensive, coeducational, regional high schools which take care of the possibilities of offering work in the thirteenth and fourteenth years. Now that kind of school must be thought of, not in terms of just preparing a group for certain institutions of higher level, but as the kind of a school that really capitalizes on the natural and human resources of the earth. Any school which does not think in those terms, it seems to me, does not live up to its promise or its intent. We can no longer have a curriculum which will teach children that the grass is greener out in California or out in Massachusetts, or down south somewhere. They must know that the grass can be green at home if they want to make it green and if they want to utilize all of the resources, knowledges, and skills they have in order to develop the advantages and possibilities for living in their own areas.

In Garrett County, Pennsylvania, an instructor in a school where most curriculum opportunities were lacking took a small group of boys aside and suggested that they might be able to grow potatoes if they gave the matter some study. Much to their own amazement and that of everybody else, they grew a high quality potato which was in demand by the hotels in our larger cities. Buyers even came in and contracted for the potatoes while they were still in the ground. In fact, in two years the potatoes from the farms of that county brought over two million dollars. That county capitalized on its natural resources.

The number of things that can be done are unlimited if the community only knows how to capitalize on its natural and human resources. As I visit all sections of our country I find that high schools in general teach for remote living, not for the task of living today. The school and community resources, the needs of the people, the real desires and opportunities that are required for good living have not been thought through fully and completely enough. In fact, they have not been brought into the school building itself. So we, as educators and architects, have great jobs to do when we build for tomorrow. All of us know that there will be buildings built which will be obsolete the day the doors are opened. Nevertheless, I think we are making some progress toward the kind of schools that are adjusted to educational specifications and community requirements.

Probably the best way to put into the hands of the architect a statement of educational and community needs commonly known as educational specifications is to have as many as possible of the intelligent people of the community participating, trying to determine trends, trying to be interpreters of those who are to come and use those buildings in the future. It is important that we know what those big forces are that are playing with us and controlling us and deciding what America is to be 20, 30, 40, or even 50 years from today.

In the past we have had an unbounded faith in this America of ours. We have believed that we could achieve anything, and I can assure you that that is not going to be true in the future unless we capitalize upon all of the human resources and associate all of those resources into groups so that we may utilize their natural resources to the greatest advantage. That means that the schools of the future are going to be different from

anything that you or I have ever seen. Nevertheless, some of us will have to dare to go out and build them. The Arsenal Technical High School in Indianapolis was well thought out back in the days of Milo Stuart. They had imagination, they had ideas for a school building. I believe that over the many years there has not been any high school in this state or any adjoining state equivalent to the Arsenal Technical High School in its relationship to the total needs of the people. The city obtained considerable land and has utilized it. It may be that it would have been a much better school if more people had been allowed to participate and render more service in planning it, but at least it was well done for the time in which it was built.

In your planning are you really recognizing all of the trends that are occurring in the social life of today? Do you realize that there is a considerable decrease in the size of the home, but not necessarily in the size of the family? What are the opportunities for learning in the homes of today? There are thousands and thousands of these little homes being built all over the country where the opportunity for living for boys and girls, other than just sleeping and eating, do not exist. Is there a room where the boys and girls may be allowed to turn on the radio for a while without disturbing everyone? Is there a work bench or a place for a work bench for the boys, or a place for the girl who might be able to create something that would stir the imagination of the neighbors or the family? Our homes are being built small due to economic necessity, and our schools should be providing the kind of opportunities that the homes do not provide.

Some time ago we visited a suburb of Washington, D. C., where we entered home after home one Sunday afternoon. In not one of them was there a chance for a child to have a little work bench. We suggested that work benches be put in the schools, but how much of this stuff can we put into the schools? How many work benches? What types of work benches? What provisions? What kind of opportunities? Who will use them? Will the fathers and sons, working together, use them in the evenings? What kind of a place should they have? What kind of a situation must be developed so that the father and the son, the mother and the daughter of the family can meet and protect the sanctity of the home? Well, you know the number of marriages throughout the country that go on the rocks in perhaps one, two, or three years after marriage. What do you think the school might do to contribute something to reduce that loss and to give us a far better record so that the unit of our society, which is the family, will protect our society in the future?

When you think of a classroom, do you think of it merely in terms of limited learning? Most of my teachers knew very little about society. My brother and I lived near a little brook that ran through the hills of Connecticut, and we spent much time walking up and down that brook. Every 200 yards or more we unearthed ruins of the old family factory civilization, formerly of New England, which produced a lot of skills and a lot of economic substance for New England. Why were those ruins there? Because a big river was running a short distance from our town and man had learned to build a big dam in the river and harness the water for electric power. No teacher told us about that. Yes, we studied ruins,

but they were the ruins of the Acropolis and the Forum, and I can assure you that a lot we learned was not true. I have been there since and found it out.

We were never told that some 15 factories on this stream were in ruins because education had never given those people an opportunity to make an adjustment. The schools had done nothing for them. They went the way of the ignorant and untrained just because the schools did not serve them. Do not think for one second that that story cannot be retold over and over again in different parts of this country for the simple reason that the schools never played their parts.

A few years ago one of my colleagues and I visited St. Johns, Newfoundland, a beautiful city of about 35,000 in those days. They had a system of education that was tied to the church and to different social levels. If you were poor you went to that degraded school over there, and if your father paid his bills by check you went to a school a little less degraded. They had a curriculum, but what kind of a curriculum? One of the leaders of the community discussed this whole thing with us one night in his home, he said, "We had all of this wealth, copper, and iron, and were never able to mine it because we did not know how, so the Germans came over and took it from us for a small price; in fact, some of it was used in the World War to shoot down your soldiers. Then the British came over and for little or nothing bought our forests. Why? Because in England the Britishers wanted their morning paper at breakfast and the Newfoundlanders did not need morning papers because they could scarcely read. Then came you Americans from the states and took possession of every small deposit of minerals that we had. Yes, you paid us but you never paid us the proper price because we were ignorant and did not know how to develop our land. Then the Canadians came over and developed our water power and acquired to a great degree part ownership in our water power."

You see, there was a land that abounded in wealth. Did education do anything about it? No, the Newfoundlanders had a theory that the only way they could maintain their wealth was to keep their children ignorant, so that the boys could go out and do the hard work of fishing on the banks of Newfoundland and Novia Scotia. The girls would not marry boys if they were educated, so they said, "Let's keep them all down on this level of ignorance, rather than educate them. We will build our society that way." To a more or less extent that whole thing is being repeated in community after community in our country. If education is for no purpose or for a limited purpose, what is it for?

I was assigned a topic, "Look Well to Your Planning." Now what are you planning for? What are you trying to do with these human beings? When they arrive at my age in life, what satisfactions do they have? What satisfactions should I have? What are the contributions that education should make to your living and your thinking, to your joys of life, to your looking forward to what is beyond? Certainly something should be contributed by the schools. There should not be despair, indifference, or a total lack of regard of what goes on in the world. Life should be something that has zest, inspiration, interest and training, vigor,

human honesty, and human purpose. Some of the better schools are not just putting brick and mortar together, covering a little bit of steel with concrete, and putting a little asphalt tile on a slab or a little ceramic tile here and a little brick there. They are trying to build for a purpose, and that purpose must be a very lofty thing.

So you people who get together and think this thing through will have to think about a school which has a whole series of these purposes. The architect has to take the dangling ends of those purposes and, with the education group, draw them together into an adequate schoolhouse that is not so imposing or monumental that people will point it out as "the glorious high school of so and so," but rather, that they will say, "Of the thousand students in that high school last year, 200 graduated, and everyone of them went into a constructive field or into a constructive job. Thousands of people visit that school every week. It is occupied every night. It is a community school, and every little feature of the school was thought through in terms of community use. Yes, they have an auditorium and a gymnasium, they have carpentry for older people as well as for young, and they have a community survey room. They also have a place for young children, so that the habits of children at a very early age can be studied." That kind of a school ties in with real living and does not just play around the fringes of real living.

Now, if you are going to have that kind of a school, you are going to have one room that is lacking in most schools of today. Very few schools have a room which they call a curriculum laboratory, with someone in charge who is doing things that will help others to look into the future. Not all schools would be large enough to have a room of this kind, but certainly most schools are large enough so that they can afford to carry the burden of expense of a good curriculum laboratory which feeds out into all of the realms of that school the kinds of materials and suggestions which will help that school keep adjusted to the social, economic, educational, literary, art, and amusement trends of the neighborhood and of America as a whole.

When I think about a schoolhouse, I say, "Let's know our community first." A schoolhouse that is developed without a comprehensive community survey is almost bound to be a failure. You had better know your community, and you had better know it, not superficially nor incidentally, but so thoroughly that you can see all of its features, all of its expressions, what meaning it tends to convey, and what contributions it is making. If you do not know these things you cannot build a school for that community. The architect should be very active in participating in that kind of an analysis.

For a period of five years I was associate superintendent of schools of New York City, in charge of the building division. We had a big building department which, over that period of years, built billions of dollars worth of school buildings. Then, through the kind assistance of Mayor LaGuardia, we obtained a group of about 25 private architects to serve also as planners. It was interesting to me that, when I asked the bureau which had been serving all these years what the criteria were that determined the nature of the auditorium, the answer was, "What do

you mean?" The only answer given me was that they built it to take care of the school enrollment. Then I asked, "On what basis do you determine the size and characteristics of a sixth grade room? What are the actual operations of teaching that go on in a sixth grade room?" And again the answer was, "Oh, we don't have to bother about that; we just plan a room." So I said, "We spend millions of dollars planning kindergartens. What do you know about a kindergarten? Of course, they house young children, but do the kindergartens just bring them in and have them sit there all day? How do they teach young children? How do they break down the program?"

In the kindergarten they want an art unit, a little home unit where home life can be enacted in pretty good fashion, a little book unit, a little industrial arts unit, a science unit, a little unit for general work, a little unit for blocks, etc. In fact, they need about 15 units. Now how many square feet do you need for each unit? You cannot plan unless you know such details. You should know the number of toilets and lavatories needed for the kindergarten, and whether the teacher plans to use those for incidental purposes or as media for teaching good personal hygiene. You should know the differentiation between the first grade and the second. You should know how they teach social studies up in the ninth grade. How are laboratory projects going to be worked? Are you going to use textbooks, recitations, or actual experimentation? In order to analyze those things, you need to think them through in terms of all of the problems of the various subjects. For example, you must think of social studies in terms of communication, transportation, food, housing, clothing, and all other things that children need to know about the social development of mankind. If you think that through fully and completely you are going to have a type of a room that you have never thought of before, and you will have justification for it. There is not much justification in giving a social studies class a room 23 by 35 feet or 37 by 40 feet, with no further consideration given to the activities that are to take place in the room. It has no inspiration about it. It is simply a cut and dried fixture, an institution.

Do not think for one second that education is standing still. If education were standing still today, America would die. Education is forging ahead with speed and power, and the trends are marking a new era for public education. We are at the beginning of the development of a program of public education unlike anything else in the history of the world, largely because those who have been in power or are in power see the possibilities, the advantages, the ways in which we can use education today. Look, for instance, at this lay commission which has been rather self-appointed, made up of Roy Larsen, editor of *Time* and *Life* magazines; Beardsly Ruml, who made us pay our income taxes on time; John Stevenson of the Penn Mutual; John Coles of the Minneapolis papers; Eugene Meyer of Washington fame; and others. They want to find out what is the matter with education and they are going to find out. They want to put the power where it belongs. They want this driving machine of education to get the results that we need in our society, and they have the money to find out. But, they have to see what we are driving at They

have to find out what we are thinking about. With the backing of a non-professional, interested commission such as this, education can be made to take its proper place in the development of our American life.

The schoolhouses that we build here are not unlike the schoolhouses found in Germany, France, and Italy previous to the war; in fact, the schoolhouses in Italy are far better than most of those we have had in Indiana because schoolhouse after schoolhouse was built by Mussolini to further an ideology. However, the school building itself does not determine the progress; it must have something else within it, the soul which really breathes the essence of what we seek to do in a democracy.

You can go into the city of Milan and find on 40 acres of land in the heart of an industrial area a schoolhouse built by the House of Savoy at the direction of Mussolini, which would justify the dream of democracy. It had everything. It had all kinds of opportunities for boys and girls—everything you would want to put into a schoolhouse, even to one of the biggest swimming pools that I have ever seen; a beautiful gymnasium; a farm house for girls, which represented the best practices in Italy; also a city dwelling for the girls; and places where sick children could be cared for for a period of six, eight, or ten weeks before they were allowed to go back home and sleep in the slum areas. Children were fed and clothed there, and were taught all of the things men and women have to know to take care of the home and make a living, especially in connection with the growing of fruit gardens, vegetable gardens, and little orchards. Every child had a pet, a chicken, duck, goose, or some kind of a feathered animal, which he would go out and visit at the lunch hour. But the curriculum of these schools had something that was stifling, deadening, poisoning. That killed the school as far as I was concerned.

In Sorrento, off the shore of the Mediterranean and in a beautiful orange grove, we found another school building. I tried to buy the specifications and plans from the architects, but I have not seen them yet. When asked how they arrived at the price for such a building, they said that Rome fixed the price, that everybody bid but one man was told what to bid and got the job. The Swiss proprietor of a nearby hotel took considerable interest in the erection of this new school and, being an archeologist, he watched with interest the digging through layer after layer of ruins of other civilizations which had taken centuries after centuries for man to develop. In fact, this was the spot where the temples of the past had been built, the temples to the Gods of War, to the Gods of Love, to the Gods of Dreams, etc., and finally Mussolini put his temple on top of this gathering of moraine. One day this young Swiss proprietor said to me, "That's a beautiful structure, but it's like all the other structures built there before it, and it is going the same way as the others. It was built to an ideology. It won't be worth anything, because it isn't being built to the proper ideology, to the proper adjustments of human beings, to the proper knowledge of human beings for the proper care of human beings."

Schools must have something behind them, something that is real, something that fits into this society of ours, not in terms of mechanics, materials, or little gadgets but of a spirit that permeates the whole environment. This new type of planning requires all of the skill that the

architect has, and every bit of skill and knowledge that the educator has. The architect should not be forced into a competition in his field nor asked to cut his fee. If he has to cut his fee, he has to cut somewhere either in the drafting service or in the amount of food he puts on his table at home. He is rendering a professional service. Not only should the fee be determined, but every detail of this service should be defined. In this way all interested parties will know what is to take place. The educator will know what he is going to get, and the architect will know what he is going to deliver through all the planning process. The community, too, should be brought into the development of the educational specifications, and through this desirable cooperative arrangement you not only will look well to your planning, but you can plan well for the needs of society today and better meet the needs of the generations to come.

THE EXPERTS PREDICT THE TRENDS

ROUND-TABLE DISCUSSION

Presiding: J. EVERETT LIGHT, Superintendent of Schools, Rushville, Indiana
Discussion Group:

RAYMOND S. KASTENDIECK, President, Indiana Chapter of the American Institute of Architects, Gary, Indiana
RALPH LEGEMAN, Architect, Evansville, Indiana
KARL R. SCHWARZ, Architect, South Bend, Indiana
WALTER SCHOLER, Architect, Lafayette, Indiana
N. L. ENGELHARDT, SR., Educational Consultant, New York City
JOHN H. HERRICK, Ohio State University, Columbus, Ohio

MR. LIGHT: Mr. Scholer, will you open our discussion on "The Experts Predict the Trends"?

MR. SCHOLER: I think that one of the outstanding trends today is that schools are being built on large areas rather than on small city blocks. This gives the architect greater freedom in planning, and permits informal arrangement of rooms. It makes possible one-story rooms which are more flexible.

QUESTION: With reference to expansibility, should one plan a heating plant for the entire proposed group, even though it may be several years before the entire building is completed?

MR. SCHOLER: The trend is to break up the entire plant into units, e.g., office, maintenance, classroom, etc., and to provide heating and other facilities for each unit by means of oil or gas. Individual toilets are being provided for rooms up to the sixth grade.

QUESTION: Is it feasible to have individual heating units for each room?

MR. ENGELHARDT: In the past we have been too liberal in the amount of space we have given to heating and ventilating units. I think we are going to package the service of heat, ventilation, toilets, etc. The more we do it, the better off we will be. There may not be a toilet for each classroom, but perhaps there can be one for every two classrooms.

MR. LEGEMAN: The package unit for automatic heat is all right, but in areas where the use of coal predominates the central station job is necessary.

MR. ENGELHARDT: Yes. However, we are coming more and more to use gas and oil. We are very wasteful of our coal as we use it today in our schools. Coal has been converted into other forms. Powdered coal is being used almost exclusively in some units in the West.

QUESTION: Is anyone using earth heat?

MR. SCHWARTZ: The cost of electric power is too high in this area. For a seven-room house a three to five horsepower compressor is used. At present we do not know enough about soil, and we must know more about the heat properties of the earth before we can perfect this method of heating.

Mr. ENGELHARDT: Experts at the Massachusetts Institute of Technology are progressing on the problem quite rapidly, and I believe it will be within the lifetime of the middle-aged folks here that we shall see a spread of this type of heating. We have considered coal as the main source of heat, but this is soon to pass out.

Mr. SEAGERS: Atomic heat may come first.

QUESTION: Is mechanical ventilation necessary?

Mr. ENGELHARDT: There is no scientific basis for requiring 30 cubic feet of outside air per child per minute. What we really want is air movement, proper temperature, and proper humidity. The last is the hardest to control. Movement of air may be all that is necessary, and maybe it can be done by a couple of quiet fans. In New York, millions of dollars have been spent on junk in an effort to meet building code requirements along this line.

Mr. SCHOLER: In Indiana we are down to 10 cubic feet of air per pupil per minute.

Mr. ENGELHARDT: That should be 200 per cent better than we have in New York City. We probably need some movement. We must have no noise and no draft. Probably 7 to 10 cubic feet of air is the correct amount.

Mr. SCHOLER: We must have 10 cubic feet of fresh air and 20 cubic feet of recirculated air in Indiana.

Mr. ENGELHARDT: Seven to 10 cubic feet of any kind of air is plenty.

Mr. SEAGERS: What constitutes "fresh air"?

Mr. SCHOLER: Our law says "outside air," not "fresh air."

Mr. SEAGERS: Country air may be as contaminated as city air. If we have only 7 to 10 cubic feet of air per pupil per minute, will it be enough to take care of the stinkers?

Mr. ENGELHARDT: Give them a bath and it will. In school we should be teaching cleanliness. See our New York State Recommendations.* Mr. Seagers made the pilot study and was on the Commission. In my opinion, a window and a method of circulating the air is all that is necessary, and we can cut out all the expensive equipment.

Mr. LEGEMAN: If we get the state law and study it, I believe we will see that it is written in such a way that we can get the results we desire here in Indiana.

Mr. SEAGERS: One fault with recirculated air is that it mixes up the germs of all the rooms and redistributes them. It seems to me it would be better to provide 7 to 10 cubic feet of outside air and then have a unit system or fans to recirculate the air in each room.

Mr. LEGEMAN: It is possible to do this according to our law. I believe the law is broad enough to allow us to do what we want. We are hidebound by tradition, not by laws.

Mr. ENGELHARDT: We are talking about manipulating gadgets; we are not talking about education. We should build a home for the child. What does he need? What should we provide in order to achieve the results we want?

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* *Heating and Ventilating Recommendations for New York State Schools*, The University of the State of New York, State Education Department, Division of School Buildings and Grounds, Albany, 1946.

Mr. KASTENDIECK: Left to teachers, hand-operated ventilation is unsatisfactory. I should like to mention another trend. Square and larger rooms will require bilateral lighting to help out on the far side of the room.

Mr. MCGUIRK (Indiana State Department of Health): The Board of Health approves of opposite wall bilateral lighting for any grade. Corner bilateral lighting is limited to grades up to the third. Both the child and the teacher are being considered in this ruling. In shops, etc., anything goes.

Mr. KASTENDIECK: Corner bilateral lighting is O. K., especially when the seats can be moved. The pupil is more important than the teacher.

Mr. ENGELHARDT: Unilateral lighting is just a carry-over from Europe. The architect should have freedom to arrange his room and plan his lighting as he sees fit. He should not be tied down by convention or by law.

Mr. SCHWARTZ: Frequently the optimum functioning of a room is not achieved because the architect fails to educate the staff and teachers properly in the operation and use of all the new developments which have been built into the building.

Mr. ENGELHARDT: The kindergarten is a good example of the way a school should operate. It has been conceived according to the needs of children. This is true, but it was originally forced upon us by the laymen and not dictated by education. It is necessary to follow the interests of children in order to get direction in the planning of buildings.

Mr. SMITH (Indiana State Department of Public Instruction): I have been impressed at this conference with the efforts to link the purpose of education, method, content, and activities with facilities, plant, grounds, and equipment. These trends of thought, if followed out, will have an imprint on building.

In the traditional school we required the mental activity of memory. There was the question and answer type of activity. Then we shifted to the activity school, and we all agreed that growth comes from that activity. But there is another problem here, not simply that of improving from this little activity and that little activity. There is the problem of harmony of growth and development. Can this come wholly from a series of activities that are unrelated in the mind of the individual? They may be related in the mind of the teacher, but are not necessarily in the mind of the growing child.

I have been impressed with one phase of education in India and wonder if we could not copy it to some extent, that is the opportunity they give for what we might call a period of contemplation—time to rest from the physical activity and think over the meaning of these, a period that would result in a harmonized development of that individual. We have resorted to that system in the lower grades to some extent. If that is a correct assumption, what are the implications as far as the school plant is concerned and as far as method and content are concerned, but primarily from the point of view of the school plant?

Mr. ENGELHARDT: Dean Smith has brought together a very helpful philosophy. Of course we want time to concentrate within ourselves upon

the things we have been doing, and we should provide more opportunity for contemplation. In education we have been thinking largely in terms of the mass. Our media are mass media, at least that is the way we have used them. We use the textbook that way, stupidly giving everybody the same textbook. I think I could build a good case for never giving two children the same kind of textbook. We have a state adoption, a mass system of handing out something. But the concept of mass education or of state adoption or of handling a group using the same subject matter is against the whole philosophy of education, and especially against the whole psychology of living, the psychology of childhood, the psychology of growth.

We use the motion pictures very largely as a mass means of education. There probably would never be any finer opportunity for contemplation than would be provided if we put into our schools, even down in the early grades, a place where one or two children might look at a motion picture by themselves, think the whole thing through, coordinate it perhaps with everything that has been going on, and then come back and report to the classroom. Children like to do that kind of thing. We ourselves, I mean this discussion group, are getting a great kick out of being a little elevated over the rest of you. And yet you know we never give a child in most of these modern classrooms a place where he can get a little bit higher than the rest of the group. If we could give him some place where, after reflecting, after contemplation, he could present his ideals and could feel something in the way of supremacy, we would be developing leaders to a far greater degree than we are.

I have seen children down in the first grade get up on a little temporary platform in a corner, and get the thrill of their little lifetimes out of being able to say something to the group and feel that the whole group was listening and that they had had a thought and conveyed an idea out of which would eventually come some growth. They would not know about the outcomes, perhaps, but there are a lot of those factors which we should be thinking about in our new schools.

To come back to this matter of contemplation, how is it achieved? In a California school a short time ago we had a "quiet nook" where, instead of having bright fluorescent lights running up and down the ceiling, we had a little lamp so a youngster could sit comfortably and read by himself in his corner. You say this is expensive? Yes, but just think of it, you are adding to the concepts of living and of growth. Too frequently we allow ourselves to be led astray by developments which we feel are essential in our economy in order that men may have jobs to do. Yet I feel we could create more jobs if we were to go at it with a finer analysis of the whole problem of human growth and human learning and of teaching.

Your concept of contemplation, Dean Smith, is a very interesting point, and I feel it is tied in intimately with all the things that we can do in a school. Very frequently the teacher chides a child because he is quiet, instead of congratulating herself upon having subdued one child.

I am afraid I have reached the point where I would like to go back into the classroom and be a child myself again. I wish there were some

way an adult could be transferred, so that he could go down there and sit with the children, think with the children, act with the children, see the whole thing again through a child's eyes rather than just through adult eyes. I think that is what we have to try to do. More and more I am suggesting to the architect, "Don't try to plan a school until you have lived in the community a while. Go down there and talk to the children on the playground and on the streets, go down and talk to the parents. Go into the old school to see what they are doing. Find out what they like, get the environment, the feel of the thing. After you've done that, talk with some of the adults of the community, make your own community analysis and surveys. You might spend a month doing that, and then what do you think would be the outcome?"

One of my architectural friends in New York did that in a little place called "Frog Hollow" in New York City. We have a little place there that was a frog hollow and it still keeps its name. He wants to call the school "Frog Hollow School." That is a wonderful name for a school in New York City. The architect wants a place where the frogs can grow and the children can see something of that original life, and the park department is going along with him. We have had one of our famous sculptors make two huge frogs which are at either side of the main entrance of the primary unit. They are of bronze and the children can play on and around them. This architect got ideas for the school that were gathered from here and there, from the youngsters and the parents and the traditions of the neighborhood. The children of this school will perhaps, somewhere in their lives, have an opportunity for contemplation.

I was glancing through some material the other day that had been checked by an experienced and efficient proofreader, and I found that somebody had overlooked a certain word. Instead of a "dishwashing" unit in the text it read, "wishwashing" unit. You know, I rather like the term now. I think I'll leave it in. If we would just take our wishes and our desires and fix them up so they really look like something and are worth something for the rest of mankind, we might have the right kind of a unit. That's what you've been thinking about isn't it, Dean Smith, a "Wishwashing Unit"?

Mr. HINES: We have been talking about "establishing schools for living." Not very many of our pupils are a twin or a triplet or any multiple of the human species, yet we group them together and talk about the first grade, the second grade, the sixth grade, and so forth. Is there a trend towards breaking this down and putting children of different aged groups together more than we are now doing, letting them live together in the same manner in which they live together in the home, so that some children can have this experience of being elevated just a little, as Dr. Engelhardt says?

In a school in Hamburg we noticed that they were placing children of about three age groups together in a room and were having very fine results. The older children get much from working with and helping the younger children, and the younger children profit much from the experience of the older ones. This is more nearly an example of cooperative living than it is to have all children of age 7 living in the same room. Is

there a trend in the direction of breaking down our ideas of age groups remaining together, as we do in America?

Dean WRIGHT: The primary unit idea that was mentioned a while ago, of kindergarten through the third grade, almost immediately diminishes the idea of grades as such, and tends to make for more heterogeneous groups.

When the primary unit is built, we no longer have a first grade, second grade, and third grade. What we have is a group of children who range in age approximately from 5 to 8 or 9. The manner in which we bring those children together may contemplate a total disregard of the question of age for certain purposes. I think there is plausibility in your idea of this unit, and you should forget the word "grade" with its present meaning.

Mr. ENGELHARDT: I think Dr. Wright has put his finger on a very difficult problem, this question of how to get away from "grades." In the Hillcrest School in San Francisco, which is about to go to bid, the architect is following a lot of suggestions of teachers and others. He has named every room, and the word "grade" does not appear anywhere in the building. There is, instead, a Mark Twain room, a Bret Harte room, and so on down the line of names of the old boys who "raised cain" way back there in the early days in San Francisco. The school will have local atmosphere. The grade has just disappeared. Now, there will be rooms, spaces into which children will be placed, and I am not so sure that they define the groups by age. I think probably that children up through that period ought to be considered as ageless.

Age does not really mean much, it is the capacity for learning, the introduction they have had to learning, that counts. There will be tremendous variations. If we can build a school which will provide opportunity for growth, for small group instruction, it does not matter whether children are in the second or third grade. They will be brought together for instruction so that they can all be moving forward at their own pace. It may be that by the time they have finished the third year of school we will have a finer product than would have resulted from just putting them through the regular paces of a grade system.

Here is another illustration that borders upon what you are thinking of, Mr. Hines. In the Will Rogers High School at Tulsa, Oklahoma, we planned a unit for small children. There is a place for rest, by the way, and a place for diet, for nutrition programs, and for play as well as for some serious development in the reading processes. The whole program is being carried on in cooperation with girls from the school itself. They are given contact with the younger group. It might have been better if we had had some older children in between the two in age, so that we would not have had quite that disparity.

Paul Mort went down there to visit one day, and when he came back he reported that there was a bunch of football boys down there running a nursery school in the high school. It seemed that the whole unit which had been developed for the girls had been such a success that the boys wanted their share of the time for seeing and understanding young children and getting some grasp of psychology at first hand, and so the

boys were down there to learn. It was a matter of envy on their part. They were not going to have the girls know more than they about the children who might come to them later in life. And why not? I think very frequently youth can give us ideas of what ought to be done, but we shy away from it because we have inhibitions and traditional attitudes that have come out of a peculiar kind of thinking of the past.

Mr. LIGHT: Folks, this has been most interesting, but our time is passing rapidly. Our program is to be changed just a little. The talk on germicidal lighting, by Dr. Buttolph, will be last, and we shall ask Paul Seagers to say something in the way of a summary now. Dr. Buttolph is in the process of getting here; I believe he is somewhere between here and Indianapolis. To you panel discussion members here, we all are very grateful. Let's give them a hand.

ULTRAVIOLET AIR SANITATION IN SCHOOLS

by

L. J. BUTTOLPH
Engineering Division, Lamp Department
General Electric Co., Cleveland, Ohio

YOU are asked to appraise the need, methods, and cost of air sanitation. The indoor air you breathe is under suspicion. It is said to be as polluted by respiratory excrement, the aerial sewage, of room occupants as is the water in crowded and untreated swimming pools. This aerial contamination is described as living dust. Most of it is attached to heavy particles that settle rapidly, like sediment in a swimming pool. Some of it floats free, as "droplet nuclei," or rides on particles of dust so fine that they remain suspended for a long time. When you inhale this living dust it may stay on the moist surfaces of your nose and throat. It may stay there long enough to raise families, and you become ill.

If you suspect that this graphic description may need more disinfection than the condition, investigate. You will find ample reason for doing something about the condition.

The Council on Physical Medicine of the American Medical Association has accepted the use of germicidal lamps in hospitals from tests in infant wards. Colds and influenza have been reduced by 25 to 35 per cent in navy barracks and institutions, where it has been possible to provide disinfected air most of the time that the men are indoors. The Council has not, however, accepted air disinfection in schools, pending the results of extensive studies of the value there. These studies already indicate that the incidence of the prototype respiratory diseases of measles and chicken pox is spread out through the school year; that their explosive or epidemic spread is prevented. Some think this preferable to a complete prevention of such a virus disease as measles. We believe that the spread of colds and influenza is similarly prevented in school rooms, but that they may spread outside of the schools to mask the school prevention. Natural ventilation with a minimum of drafts, smothering of coughs and sneezes, adequate clothing, dry feet, and sleep are all emphasized during the winter respiratory disease season. Ultraviolet air disinfection is used in many schools, offices, and factories as a general sanitary precaution. In theatres, where the health value cannot be measured, sanitary ventilation is being provided. Newer theaters also have two or three times the usual mechanical ventilation, as a general sanitary precaution, along with improved dust disposal and general maintenance.

The American Public Health Association has a Research Subcommittee on Air Sanitation and the American Society of Heating and Ventilating Engineers has a Technical Advisory Committee on Air Sterilization. In a recent survey of membership interest, its Research Committee found this subject sixth among 33. It was preceded in order of interest

only by such timely subjects as radiant heating, radiant cooling, the heat pump, noise control, and odor control.

Comparable British interest in air sanitation is shown by a comprehensive paper titled "Methods for Maintaining Bacterial Purity of Air," by R. E. O. Williams of the Central Public Health Laboratory (published in the *Journal of the Institution of Heating and Ventilating Engineers*, Vol. 16, No. 162, January, 1949), and by the 356 page British report No. 262 of the Medical Research Council, titled "Studies in Air Hygiene."

While all air cleaning is doubtless of sanitary value, the terms "air sanitation" and "sanitary ventilation" seem to have already been taken to describe air purification for the specific purpose of reducing the spread of disease or the contamination of products. To be of sanitary value, ventilation must be such as you enjoy in summer outdoor and indoor living. This is 10 to 20 times the minimum for odor control with maximum economy. Thirty cubic feet of fresh air per minute per child is recognized in many states as the amount supposed to be provided in school rooms. But the problem is not the simple one of cleaning up the air in vacated rooms. It is the dynamic one, in crowded rooms, of killing or removing the bacteria and viruses as rapidly as they appear from the noses, throats, handkerchiefs, and clothing of the school children. It is the problem of maintaining such a condition that no one disease germ has a chance of being alive or in the room more than a minute or two instead of the 30 or more minutes usually possible. The dynamic condition is difficult to illustrate graphically, but the theoretical rates of air decontamination in a vacated room are shown in Figure 1.

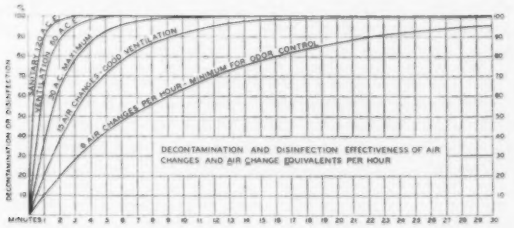
ANNUAL AVG. A.S.C. VENTILATION
30 A.S.C. MAXIMUM
10 AIR CHANGES - GOOD VENTILATION
6 AIR CHANGES PER HOUR - MINIMUM FOR ODOR CONTROL
DECONTAMINATION AND DISINFECTION EFFECTIVENESS OF AIR CHANGES AND AIR CHANGE EQUIVALENTS PER HOUR
DECONTAMINATION OR DISINFECTION
MINUTES

Figure 1

British studies of dust contamination in typical hospital rooms, with and without direct sunlight exposures, have shown a sanitary value in sunlight, even after transmission through ordinary window glass. Hours of exposure to sunlight through windows will reduce the contamination of floor dust, but this effect is even less than that resulting from small amounts of germicidal ultraviolet rays reflected downward from the ceiling of any installation of germicidal lamps for upper air disinfection. Figure 2 shows that the germicidal effectiveness of the 2400-2800A wavelengths (germicidal lamps 95 per cent 2537A) is one to ten thousand times that of the 3000-7000A wavelengths. Thus it takes hours of exposure to daylight to equal seconds of exposure to the germicidal ultraviolet rays.

It is probable that the need for sanitary ventilation is about propor-

tional to the crowding or "occupancy" of a room. You may have 2,000 to 3,000 cubic feet of air in your office, but you provide only one tenth as much per child in school rooms. It is probable that 30 cubic feet of fresh air per minute is enough for you, but the children need ten times as much.

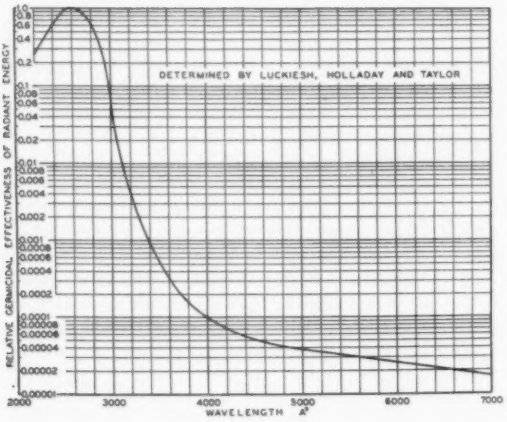

Figure 2

It is, of course, possible to provide the 30 cubic feet of outdoor air called for by some state school codes. But in northern states the cost of heating it is so high that codes are being revised downward to the practice. You can provide the equivalent sanitary ventilation for that much make-up or outdoor air much more economically by ultraviolet disinfection of recirculated indoor air. Disinfection of all the recirculated air will increase that value five-fold that of the usual provision of 20 per cent make-up air in your circulated hot-air heating system of any sanitary value.

Disinfection of all the air handled by a modern air-conditioning system will provide a sanitary ventilation of 15 to 20 air changes per hour. This may be enough for school assembly halls, gymnasiums, and libraries. Five times as much should be provided in the school rooms. This is possible only by the upper air method described later.

Ducts provide a convenient place to install germicidal tubes. Without increasing the cross section, it is possible to provide ultraviolet intensities high enough (three to ten ultraviolet watts per square foot) to disinfect completely all the duct air in the fraction of a second of its passage through the irradiated zone. The tubes are usually installed in the plenum chamber. When possible, they are installed to permit servicing through the access doors used to service the dust filters.

For ducts whose greater dimension does not exceed the lesser by more than 50 per cent, and which have nonreflecting walls, the ultraviolet watts

for a theoretical 99 per cent disinfection of respiratory disease germs and viruses is shown on the Haynes' chart, Figure 3. Relative humidities in excess of 65 per cent and extremes of air temperature increase the ultraviolet requirements.

The number of germicidal tubes required may be determined by dividing the total watts by the average-through-life rating in ultraviolet watts of any commercially available germicidal lamp. The chart may be interpolated and extrapolated by noting that the ultraviolet watts required are directly proportional to the cubic feet per minute and inversely proportional to the lesser dimension of the duct.

When flat ducts have one dimension two or more times as great as the other, which is frequently the case, reference to more detailed methods of calculation should be available elsewhere, but the maximum tube requirements may still be determined from the preceding tables by subdividing the duct and the air capacity, so that the dimensions of the subdivisions fall within the range of the tables.

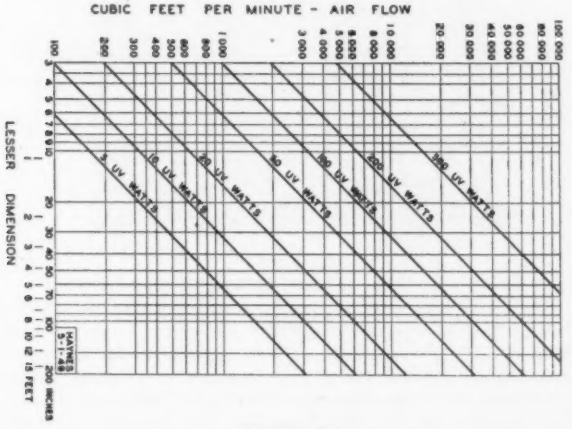

Figure 3

The mechanical details of a germicidal tube installation follow closely those of the dust-filter installation, and it is anticipated that manufacturers will provide similar standard-unit assemblies. Although there are many ways of installing germicidal tubes in air ducts, the best compromise in small ducts is that of placing them lengthwise on the duct wall, on four- to five-inch centers, grouped in the center half of the duct walls and away from the corners of rectangular ducts. The duct walls near the tubes, and for a distance equal to the duct width in both directions from them, should be of polished chromium plate or aluminum if the conditions are such that the reflective duct walls can be easily cleaned whenever the lamps are cleaned. Since the germicidal tubes must be kept reasonably free of dust, there must be convenient access for cleaning. This usually can be arranged by hinged panels on the sides or the bottom of the duct, and, if

necessary, the tube may be mounted on these panels as well as on the stationary duct walls (Figures 4A and 4C).

In large ducts and plenum chambers, germicidal tubes may be assembled like the rungs of a ladder in vertical frames supported in the center of the chamber in whatever series or multiple arrangement best fits the local conditions and provides access for cleaning and replace-

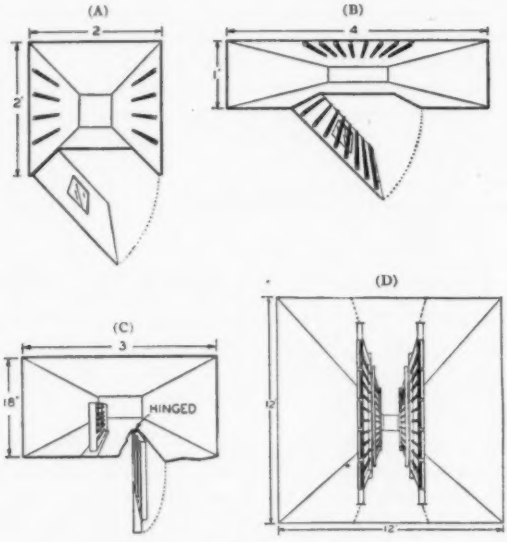

Figure 4

ments (Figure 4D). In very large ducts, where the air speeds are relatively low, the tubes should be so placed, when possible, as to provide a maximum average distance from the tubes to the duct walls in directions perpendicular to the tubes, regardless of the direction of air movement.

There is a special installation problem in case of flat ducts which may have one dimension four to six times the other. Such a duct cross section limits the effectiveness of the tubes not only in proportion to the lesser dimension but also because but little of the duct volume beyond the actual location of the tubes is useful for air irradiation. In such cases the tubes should be distributed only over the wider duct walls to within the lesser dimension from the edges (Figure 4B).

Figure 5 shows a typical large duct installation providing a total of 120 ultraviolet watts, average through life, from germicidal tubes placed adjacent to the dust filters.

The free convection in rooms, basic to all warm air heating without forced convection, is by random intramural air currents at velocities of 5 to 25 feet per minute or 1 to 6 inches per second. This imperceptible air movement through a horizontal plane seven feet from the floor, for ex-

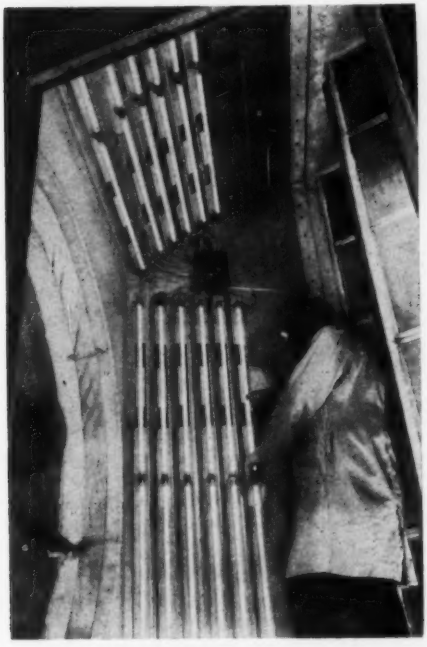

Figure 5

ample, is remarkably effective in providing an interchange of air between the room volumes above and below that plane. It amounts to an air change per minute or 60 air changes per hour, in the lower air, at an average air velocity of less than 15 feet per minute (3 feet per second). This may be a difficult concept for those who associate one tenth that rate of air change with duct air velocities 10 to 50 times greater.

If the ceiling and side walls above the seven foot level could be removed without decreasing the air interchange, the sanitary ventilation of the remaining lower part of the room would be provided. The bacterial equivalent of this condition can be approximated by irradiating the upper air with ultraviolet rays of an average intensity of 20 ultraviolet milliwatts per square foot. That keeps the average bacterial content down to a few per cent of that of the lower air which has already been diluted to a low bacterial content by the reciprocal process of disinfection above and dilution below the effective level of the ultraviolet sources.

Recent studies by M. Luckiesh and Associates have shown dramatically the effectiveness of this two-stage process of air sanitation. They did continuous air sampling of the irradiated upper air at an eight foot level and of the diluted lower air at a four foot level during continuous air contamination, in excess of that humanly possible in a crowded room,

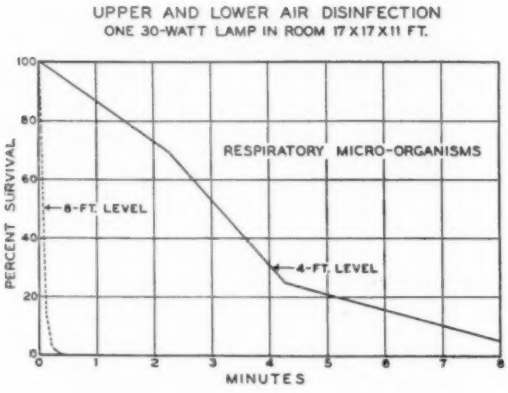

Figure 6

by atomization of diluted sputum. When the irradiation began, the concentration of bacteria in the upper air dropped rapidly to an undetectable level in about 20 seconds and remained there in spite of the continuous contamination from below (Figure 6). This disinfection of the upper air made the air interchange immediately effective in diluting the contamination below, to an equilibrium at a low level of less than 5 per cent the initial contamination, in about 10 minutes. Thereafter, this air disinfection by dilution, of over 95 per cent, was maintained indefinitely in spite of the continuous contamination by atomization.

These laboratory results can be duplicated with practical installations of commercially available equipment usually mounted 6½ to 7 feet from the floor on side walls or columns. Combined germicidal and fluorescent lighting fixtures are practical only under unusually high ceilings, over 12 feet, because of the objections to suspending such units low enough to make the germicidal tubes effective.

The only general installation problem is that of the low ceiling, less than 10-foot, which reduces the volume of upper air available for irradiation and which increases the intensity of the ultraviolet rays scattered downward to the faces of room occupants by the ceiling's ultraviolet reflectance which cannot be reduced below about 5 per cent. How serious the problem is is further dependent upon whether there is continuous exposure of room occupants in institutional class and sleeping rooms, or exposure during only about one third of the time per day, as in a day-school room.

All germicidal fixtures for upper air irradiation from room side walls must have very carefully designed and fabricated cylindric parabolic reflectors, of specular chromium plate, or preferably, of electrolytically treated pure aluminum, to project a fan-shaped distribution of energy through the upper air as far as possible before absorption in the ceiling or reflection from it to room occupants.

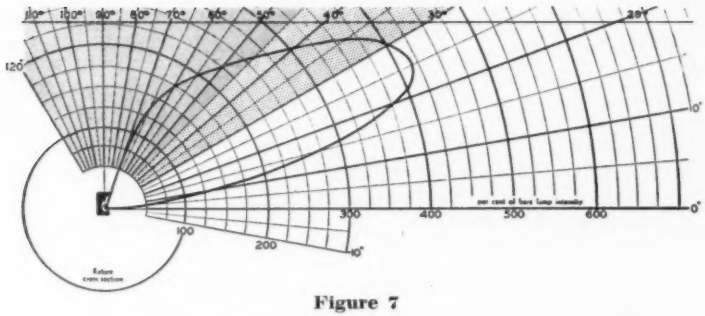

Figure 7

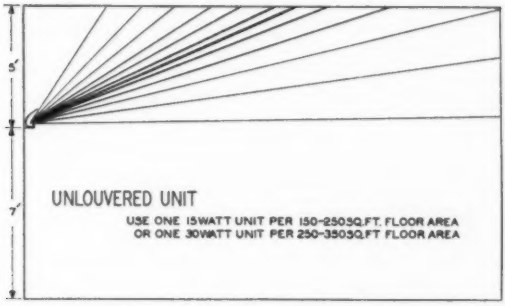

Figure 8

Figure 9

Louvered fixtures are also suitable, but not essential, in rooms where there may be only part-time occupancy and in rooms with ceilings over 10 feet high. In such rooms, open types of fixtures may be used so long

as the ceiling reflectance is still down to 5 to 10 per cent. In such rooms and fixtures, germicidal tubes up to a six-ultraviolet-watt rating may be safely used, but tubes of a higher rating should be used only in louvered fixtures. Figures 7, 8, and 9 show the spatial and schematic distributions of energy and a typical school installation. Such fixtures project 35 to 50 per cent of the ultraviolet ray output of the germicidal tube in a direction of maximum intensity 20 to 30 degrees above the horizontal.

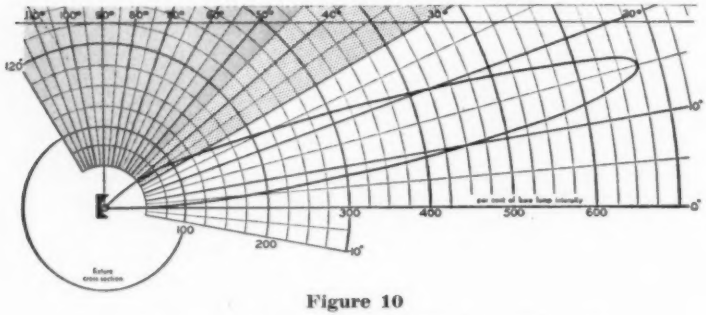

Figure 10

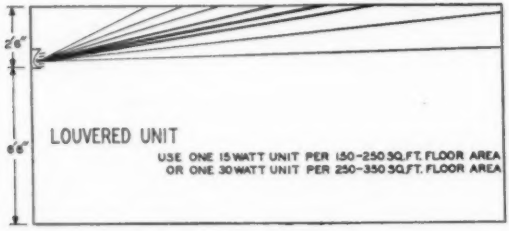

Figure 11

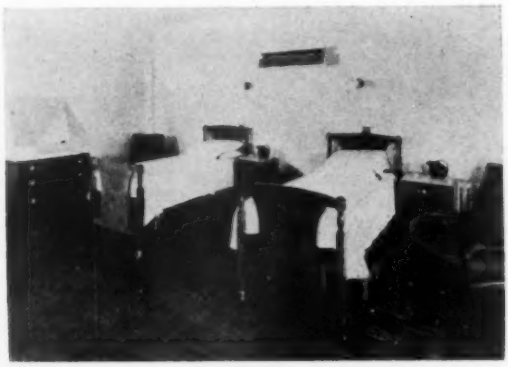

Figure 12

Wherever there may be continuous exposure of the occupants, louvers must be added to the reflector to intercept all energy directly from the germicidal tube and above an angle of about 40 degrees from the horizontal. Wherever, further, there may be continuous exposure under ceilings of less than nine feet, as in dormitories, only louvered fixtures containing germicidal tubes of less than a three-ultraviolet-watt output rating should be used. Figures 10, 11, and 12 show the spatial and schematic distributions of energy and a typical installation. Such fixtures project 25 to 35 per cent of the ultraviolet output of the germicidal tube in a direction of maximum intensity 10 to 15 degrees above the horizontal.

It is obvious that the ultraviolet reflectance of ceilings must always be considered. A meter to measure it directly is commercially available. Unpainted "white-coat" and acoustic ceilings containing gypsum products nearly always have an objectionable ultraviolet reflectance of 15 to 50 per cent, making operation and exposures of more than two to three hours impractical, regardless of the ceiling height. The "white-coat" should be painted with an oil paint, and the acoustic ceiling should be given one or two light coats of Casco wall size or filler which will have little or no effect on its color or acoustic properties and will reduce the reflectance to 5 to 10 per cent.

Germicidal ultraviolet rays, like the sun's ultraviolet rays, will fade some wall paints and papers and drapery fabrics, especially where their upper ends extend into the directly irradiated upper parts of a room. Although there has been little such trouble, the possibility should always be anticipated.

The germicidal effects of ultraviolet rays have been known and used for 40 to 50 years. They are now of renewed interest because of the recent availability of sources 5 to 10 times the efficiency of the older ones and of a form adapting them to the entirely new application of air disinfection or sanitation. Many believe the need fundamental and the solution so unique as to be of permanent value.

SUMMARY

by

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AFTER sitting through four spirited conference sessions, as we have done during the past two days, it seems rather foolish to attempt to summarize what has been said. Instead, I will try to point out some of the high spots of the conference, which may reveal some of the trends that Dr. Engelhardt has been speaking about. I, for one, dislike to see the conference brought to a close, because there are so many things that I would like to hear discussed further by the experts. It may be that the little get-togethers after the sessions have helped us to think through some of the problems that have been discussed here during the meetings.

With his excellent words of welcome to all of us, Dean Wright offered many challenges. He went back into history, and pointed out the fact that the men who do things differently or create something different are the ones who have made for progress. He was "sold on" the work of the variants. He challenged us all to stop thinking of school buildings in the conventional manner, and to dare to build something different, something more suitable for boys and girls. He set a rapid pace, which the conference maintained to the end.

It was equally fitting that the second item on the program was the discussion of schools for useful living by selected high school students under the very able direction of Otto Hughes, Principal at the University High School. These boys and girls have been thinking very seriously about school buildings. They are not interested in elaborate school buildings, but in functional school buildings with a reasonable amount of architectural detail. They want them to have well painted, well lighted, well equipped classrooms. They would like classrooms that give considerable vision to the out-of-doors and yet protect the occupants from the glare of the sun. They want the rooms to be painted in different colors and to be given more of a home-like atmosphere. They would like light-colored woodwork, green chalkboards, and all of the other features that make up balanced brightness in the classroom.

These high school students would like cafeterias, gymnasiums of a reasonable size, swimming pools, and plenty of attractively landscaped acres of land for the site. They are also interested in small theaters and better equipped homemaking departments of the cottage type, and in school buildings built on a campus plan, with a great variety of sizes and types of rooms. They were especially interested in intercommunication systems, radio studios, special areas for dramatic and speech departments, after-school recreation rooms, and civic centers. They also suggested that schools should now plan for incorporating television education in the new buildings, and that the architects should pay more attention to

more spacious lockers, freight elevators for buildings more than one story high, larger shower space, and hair driers for girls.

These are the kinds of boys and girls who should be brought into the planning of the school buildings, so that we can get firsthand information from the people who occupy the buildings.

The panel of teachers who spoke on schools for efficient teaching threw out many pertinent ideas that we should take into consideration in planning our new schools. They think that we should take into consideration how young people feel about their surroundings. Are the surroundings more or less natural? Do the children fit into them easily, or do they feel out of place in them? Can they get a drink of water easily, and go to the toilet without too much difficulty? Are things placed on the eye-level of children who occupy the room? Considerable attention was given to the fact that more room is needed both indoors and out-of-doors. It was suggested that at least 1,000 square feet should be required in every elementary classroom, and that not more than 35 children should occupy this type of a classroom.

More play space and space for gardens and out-of-door living is needed for the young people. These areas should be properly shrubbed, landscaped, and made attractive. The schoolroom not only should be made more livable by means of different colors and color treatments, but should have within its confines the many new things which have come into our culture, such as the radio and television. Children should know how to use these things and to become critical thinkers concerning them.

Furniture should be arranged in centers—art centers, music centers, reading centers, contemplation centers, and other centers—to make the room more attractive and useful. We do not live in one room at home, so why do we do everything in one room at school? One large room can be broken up into smaller areas by means of proper equipment and ingenuity on the part of the teacher. Each grade room should have its own drinking fountain, sink, and toilets. There should be plenty of storage space.

Ten principles that are helpful in providing a functional program of health, physical education, and recreation were then discussed as being: accessibility (to both students and community); beauty; economy (matched with a worth-while program); flexibility and expansibility; integration; isolation (from odors, noises, dirt, and excess moisture); safety, hygiene, and sanitation; supervision (at all times when the pool and gymnasium are in use); utility; and validity.

It was then brought out that one good method of selling the community on the school program is through the distributive education program. This program trains people to sell goods and services and develop more capable salesmen. It was suggested that schools could have a better distributive education laboratory equipped with such things as a selling counter, display counter, cash register, mirrors, stockrooms, and storage space. Many of these things would be furnished by the merchants and industries in the area if the schools were equipped to make use of these facilities.

Other very pertinent suggestions included having the health center available to the community at all times, providing proper outdoor play

equipment which can be used for strengthening different parts of the body, and offering ceramics and work with small weaving looms.

All classrooms should be set up for eye comfort rather than a certain intensity of illumination. This eye comfort necessitates use of the proper chalkboards, with high reflection factors, as well as planned painting and high quality lighting fixtures. It was thought that the present buildings have not been ventilated properly, or at least the ventilation systems have not been working properly, and that both the heating and ventilating systems for the gymnasium, auditorium, and other parts of the building should be set up so that they can be used separately without heating or ventilating the entire building. One of the things that this panel has driven home to us is the fact that frequently, after buildings are turned over to the teachers, not too much attention is paid to whether or not the services are operating properly. Perhaps the superintendents would be wise if they had a gripe session of teachers each year to find out what is wrong with various parts of the school building.

It was then our pleasure to welcome Professor Karl Lorenz, Dean of the Faculty of Architecture at Graz, Austria. Professor Lorenz is one of several German and Austrian architects whom I am sponsoring in this country. His remarks concerning the educational situation in his country, as well as the impressions that he is getting over here, are very enlightening. I feel sure that this conference will have considerable influence upon his teachings to embryo architects in Austria. Many of you have already had the opportunity to visit with Professor Lorenz, and I hope many others will take that opportunity.

It was very fitting that our State Superintendent of Public Instruction, Deane Walker, took some time away from his busy office to say a few words to us. He especially drove home to us the fact that we want good teachers to go with these new school buildings; teachers who are well equipped so that they can take advantage of all the good educational environment that can be found in and about our new school buildings. He also suggested that the architects break away from tradition and make the buildings more simple, functional, and inexpensive. More administrators should start on their long-range program of planning buildings, so that they will not be continuously building upon an emergency basis.

So many things were brought out by the parents that it is impossible to list them all here, but I would like to say that, if any group is really progressive and forward-looking, it is the type of parent who participated in this discussion on educational environment for our children. They expressed the desire to be brought into the planning of school buildings at a very early stage, and we school people are remiss if we do not take advantage of their kind offer and get their cooperation. They not only are interested in the learning environment situation, which has been discussed before, but they are also interested in the health and safety factors of school buildings. They want the buildings and all the facilities, especially toilets, kept clean and attractive. They would like to see good lunchroom kitchens and cafeterias set up, so that the selection of food and the proper eating of that food might become a learning experience for the boys and girls. They would like to see a parent-teacher room or com-

munity room with an outside entrance in the schoolhouses. Also, better recreational facilities, even to swimming pools and camping areas, health clinics, and places where little children can be taken care of properly.

They definitely brought home to us the fact that schools must have better public relations programs because, when the public is fully aware of the real needs of the school, there is practically nothing that the school itself cannot get. Schools should make greater use of the Parent-Teacher Associations, of educational consultants, and of school plant experts. It is not necessary for school officials to carry the whole load of selling the needs of the schools to the public because, when the public is invited to cooperate with the schools, it will carry more than its fair share of the burden. These parents want everything that is modern and up-to-date for the children, from proper audio-visual education facilities to more carefully planned library facilities and vocational services which can be used for avocational and recreational work. One participant summed up the discussion in these words: "A school should become not a thing apart, but something that is beautiful in the life of a child."

Then I had the opportunity to speak on the subject, "Let's Make Schools Livable." I tried to bring out the idea that we should have schools where boys and girls could feel happy, could be buoyant, could feel like participating and being a part of a harmonious situation. The plants do not have to be elaborate, but they should be well thought out and well planned in light of information received from people who know the habits, likes and dislikes, and psychology of boys and girls.

On Friday evening, Dr. Henry Lester Smith spoke about the new Division of School Plant Planning in the State Department of Public Instruction. He mentioned how the new division would function, and the help it could give the school people in Indiana.

"Designing Areas for Learning" was the topic of Dr. John Herrick, who brought very vividly to us the need for setting up a sequential plan for the development of educational specifications for the architect. Although this is a rather new procedure, the few schools that have tried it out have found that following Dr. Herrick's suggestions has paid many dividends, not only in bringing about better public relations but also in getting better school plants.

The evening session was closed with a speech by Dr. Engelhardt on the topic, "Look Well to Your Planning." Dr. Engelhardt drew from his wide range of experience to give us a very inspiring talk on planning for boys and girls. He suggested that there should be nothing inside the school building, or in connection with the school building, that cannot be of educational value. Even the clock can be of more educational value when it has appropriate decals or Mother Goose pictures beside the numbers. He admonished us to look back for the last 20 or 30 years and determine the trends, then to try to pick out the trends we find in our society today and plan according to those trends. He suggested that the schools must take greater advantage of all of our natural and human resources.

The round-table discussion, "The Experts Predict Trends," has been very spirited and interesting. We will touch on only a few of the sug-

gestions made during this discussion. The time has come apparently when we should give more thought to package heating and ventilating units, instead of the big central systems. It may be that we will use a package heating unit to heat one or two rooms. It is proposed that this type of a unit, even when installed in sufficient quantities to take care of a medium sized building, would be less expensive than a large heating system. Newer type methods of processing coal, the heat pump, and experiments on atomic energy may have considerable bearing upon the design of newer package heating units.

The old question of ventilation arose again, and it was finally decided that perhaps 7 to 12 cubic feet of outside air per pupil should be sufficient for most classrooms and any movement of air beyond this 7-12 basic quantity should be brought about through individual fans within the classrooms. It was suggested that more people should read the leaflet put out by the New York State Department of Education.

The next problem discussed was the matter of bilateral lighting in classrooms. The larger classrooms and square classrooms require bilateral lighting in order to get a better distribution of natural light. So far as Indiana is concerned, according to Mr. McGuirk from the State Department of Health, corner bilateral lighting will be approved for primary grades, while bilateral lighting from opposite walls, which includes clerestory, will be approved for most rooms, with the provision that those rooms have movable furniture.

It was pointed out that we have done a very good job in the planning of kindergartens, primarily due to the fact that we have given considerable thought to the needs of growing children and have not had to break down convention. We should plan the rest of our school with the same philosophy as has been used in planning the kindergarten, that is, we should attempt to meet the needs of the children, regardless of whether we need nine hundred square feet for a classroom, a thousand feet, or even eleven hundred.

Another high point in the discussion was brought out by Dean Smith when he suggested that perhaps we should have quiet corners or contemplation nooks where children could get away from the more or less intense activity and be by themselves to read or think or chat, perhaps with one or two other children. It was then brought out that our psychology and methods of teaching at least give lip service to the fact that we should get away from the mass system of education, the requiring of all the children to do everything exactly at the same time and at the same rate.

As Dean Wright suggested, the trend toward the primary unit will no doubt make for more heterogeneous grouping of children rather than grouping based strictly on an age or intelligence level. He thought this trend might give these small boys and girls more of an opportunity to live in a small school-community situation where greater leadership can be developed, and where boys and girls can feel more natural and can play and work more as they do in their neighborhood or out on the school grounds.

The talk by Dr. Buttolph on germicidal lighting for schools has given us plenty to think about. Few of us have ever thought of air sewage be-

fore, and we failed to realize the germs that are constantly lurking in the air that we breathe. He related the results of many experiments that are taking place and have taken place throughout the United States in public schools, hospitals, and army and navy barracks. He pointed out the air purification qualities of the ultraviolet lamp, whether it be used in classrooms or air ducts. One of the high spots of his talk was the admonishment that well designed fixtures should be selected, and that they should be installed under competent engineering supervision and checked periodically. He did not condone in any way the random purchasing of this type of equipment to be installed by any "Jack of all trades."

Thus draws to a close this third summer building conference. I wish to take the opportunity at this time of thanking the many superintendents who have presided and in other ways helped to make this conference a success. I can never repay those of you who have participated in the panels and in the discussions. I hope you have received as much pleasure in participating as we have in listening to your discussions. To you architects who not only have participated here but have given me many suggestions in setting up the conference, I wish to give my hearty thanks. To Dr. John Herrick, Dr. N. L. Engelhardt, and Dr. L. J. Buttolph, I wish to say that it is mighty nice to see you old friends of mine again and to learn more about your own particular accomplishments. Your talks and discussions have not only enlightened us, but have inspired us to go out and do a better job, and I, for one, shall feel free to call upon my old friends again to help us out in the future. To Dean Wright, Dean Smith, and State Superintendent Walker, I need give no special thanks because, as they have been public servants for so many years, they get their pleasure out of doing their jobs well, and everybody is well aware that they have made great contributions to this conference.

There are many people behind the scenes to whom I would also like to give credit, especially my assistant, R. B. Burk, who has taken over many of the details in setting up and making this conference run smoothly; to Mrs. Alice Nelson, who has made provision for the use of this room and has made the reservations for those of you who have stayed overnight; to Donald Horton, who has charge of all the conferences; to H. B. Allman, Director of the Summer Session, for his kindness and fatherly advice; to Miss Kathleen Dugdale, who will have the job of editing the bulletin; and to the many other people who have contributed in some way or another, such as making notes, typing speeches, working on the registration desks, and in various ways helping to make this conference more enjoyable for you. Last but not least, I wish to thank four members of my class who have taken so many pains to paraphrase the discussions and panels and write them up in a form proper for the bulletin. They are Norman Jarboe, Vernon Miller, George Goodwin, and Wesley Dane. Now, on behalf of Indiana University and especially the School of Education, I wish to bid you good-bye and to say that I hope you will all be back again next year to make this conference even more inspiring and more helpful.

Bulletins in the Field of Education, Indiana University

The Bulletin of the School of Education, Indiana University, was first published in 1924 and has appeared regularly since that time. Research studies of interest to educators, proceedings of conferences held, and bibliographies of educational materials have been the principal fields touched upon in these bulletins. A complete list of the bulletins may be obtained from the School of Education upon request. The studies included in the present volume and in the two volumes immediately preceding it in date are listed below. Unless otherwise noted, these may be obtained for 50 cents each from the Indiana University Bookstore, Bloomington, Indiana.

Spelling Proficiency in Township Schools in Indiana. By William H. Fox. Vol. XXIII, No. 1, 1947. 32 p.

The Language and Mental Development of Children. By Ruth G. Strickland. Vol. XXIII, No. 2, 1947. 31 p.

Testing Services Offered by the Division of Research and Field Services. By William H. Fox. Vol. XXIII, No. 3, 1947. 31 p.

Suggested Procedures for Securing Economical and Efficient Pupil Transportation. By Maurice E. Stapley. Vol. XXIII, No. 4, 1947. 22 p.

Planning School Buildings for Tomorrow's Educational Program: Proceedings. Vol. XXIII, No. 5, 1947. 61 p. $1.

Studies in Secondary Education. By Carl G. F. Franzén, Elvin S. Eyster, Nicholas A. Fattu, A. Pryce Noe, and Frank L. Templeton. Vol. XXIII, No. 6, 1947. 49 p.

The Effect of English Deficiency Upon a Student's Adjustment in College. By Robert H. Shaffer. Vol. XXIV, No. 1, 1948. 35 p.

Planning for School Surveys. By George D. Strayer, Jr. Vol. XXIV, No. 2, 1948. 36 p.

An Analysis of Various Factors Associated with the Selection of Teaching as a Vocation. By Robert W. Richey and William H. Fox. Vol. XXIV, No. 3, 1948. 59 p.

Some Variations Among the High Schools Represented at Indiana University. By Nicholas A. Fattu. Vol. XXIV, No. 4, 1948. 25 p.

Indiana and Midwest School Building Planning Conference: Proceedings. Vol. XXIV, No. 5, 1948. 72 p. $1.

School Library Personnel and Standards in Indiana. By Margaret I. Rufsvold. Vol. XXIV, No. 6, 1948. 38 p.

Suggestions With Regard To Some Persistent Elementary School Problems. Vol. XXV, No. 1, 1949. 35 p.

Public School Kindergartens in Indiana. By Phyllis Plichta. Vol. XXV, No. 2, 1949. 38 p. 75c.

Scores on the Interpretation of Data Test: Their Relationship to Measures of Achievement, Personality, and Interest. By Nicholas A. Fattu and William H. Fox. Vol. XXV, No. 3, 1949. 55 p. 75c.

Music in the Elementary Schools in Indiana. By Thurber H. Madison, Dorothy G. Kelley, and William H. Fox. Vol. XXV, No. 4, 1949. 64 p. 75c.

Indiana and Midwest School Building Planning Conference: Proceedings. Vol. XXV, No. 5, 1949. 72 p. $1.